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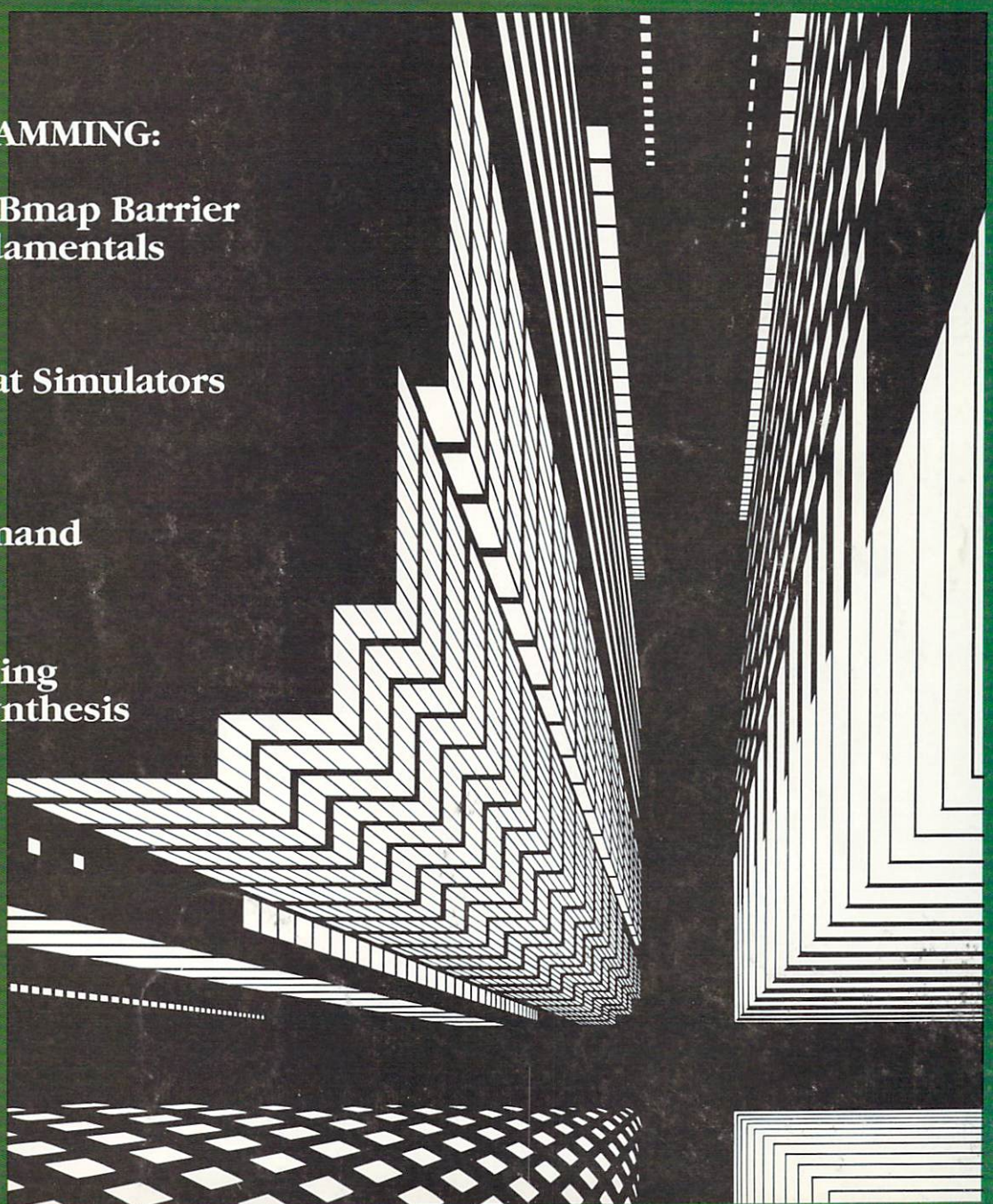
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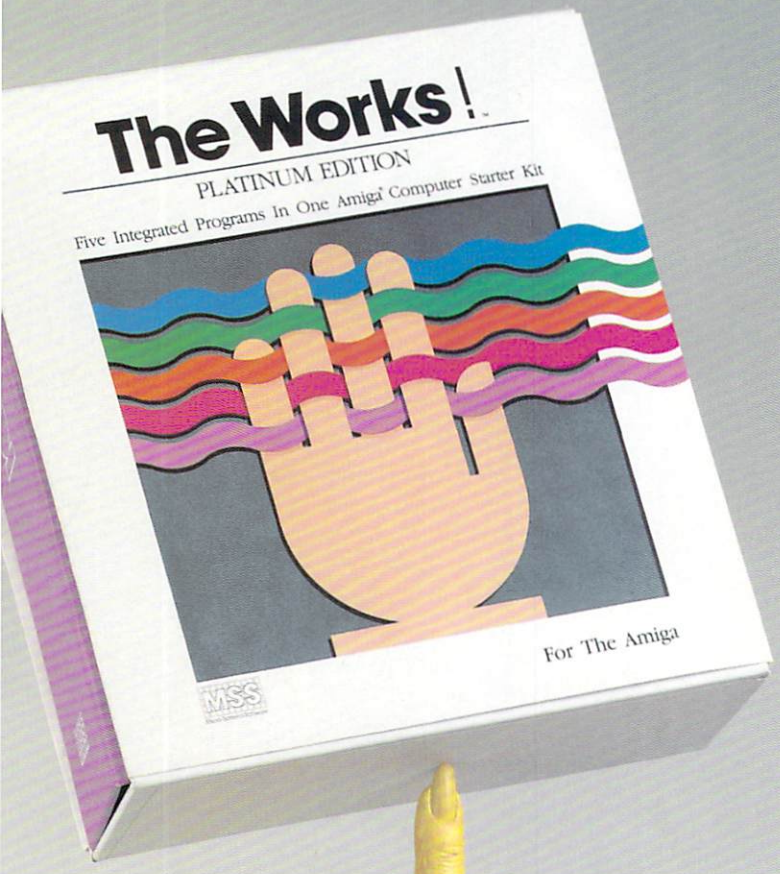
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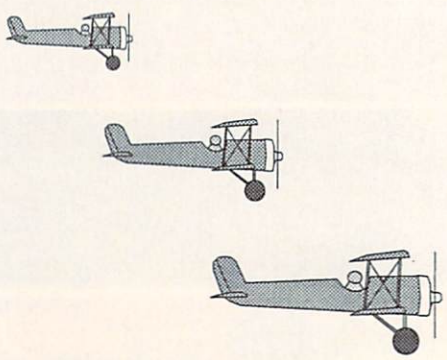
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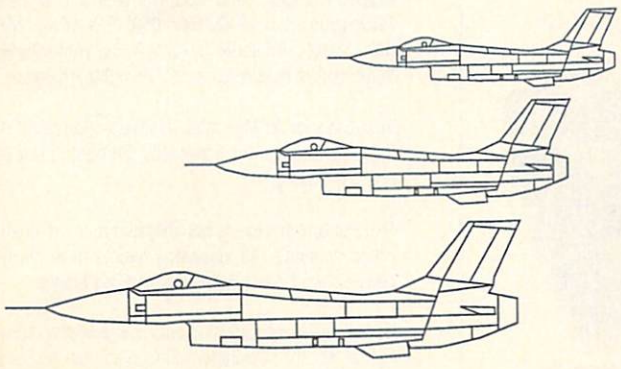
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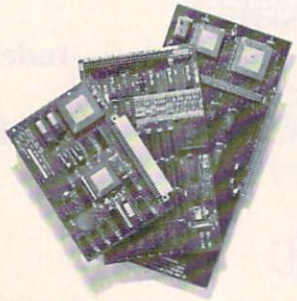
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Computermart — Leederville,WA
Diskworks — Greenwich, NSW
John Vanhoeven — Cloverdale, WA
Maxwell Office Equipment — Abbotsford, Melburn
Run Soft — Melbourne

France
A.M.I.E. — Paris

Saudia Arabia
Abdulla Fouad & Sons — Daman

Scotland
The Amiga Center of Scotland — Edinborough

Swedan
Nicholas Peerson — Lund

W. Germany
Greenville Trading & Import — Oberursel

Amazing Computing™ is also available in most B. Dalton Booksellers, B. Dalton Software Stores, Crown Books, Software Etc., selected WaldenBooks Stores, and Walden's Software Store locations.

Amazing Mail

Dear Amazing Computing,

I am writing on the subject of Amiga viruses. There are a number of techniques for dealing with them, the most effective being to use a sector editor program and examine the boot block of each disk you receive. Checking for text such as "Something wonderful has happened..." or "Byte Bandit" IS NO LONGER EFFECTIVE.

I have just received a disk with a virus on it that has no text whatsoever. In fact, it looks superficially quite similar to the standard AmigaDOS boot code. The only way to be certain a disk is clean is to compare the boot block byte by byte with a disk which has been INSTALLed.

That isn't nearly as difficult as it sounds, because INSTALL only writes 50 bytes of data onto the disk. If these 50 bytes of code are standard, then any pieces of a virus in the rest of the boot block will never get a chance to execute, so just compare this part of the boot block with that from a disk known to be clean.

Also, in case you do find that a virus has slipped past your defenses, it's a good idea to have one disk that you never put into any disk drive except after switching on the power (I use my original Workbench disk for this). That way you will know at least that disk is clean and you can use it to INSTALL all your other disks.

Don't assume a disk can't be infected just because it's write protected. Write protection works in software, not hardware, and it would be possible for a virus to bypass it.

Finally, a request to programmers: Please don't put anything in the boot block unless it's absolutely essential. Use the Startup-Sequence instead. Not only are you making your disk vulnerable— even a virus which never deliberately trashes disks will destroy your code merely by infecting the disk— but you are making it more difficult for people to protect themselves by sterilizing unknown disks, because of the risk of destroying part of the program in the boot block.

Russell Wallace
Co. Dublin, Ireland

Amazing Computing!

Please print the following letter, "AMIGA MONITOR?", in an upcoming issue in the "Amazing Mail" column. This will greatly increase the Amiga's Sales!

AMIGA MONITOR?

The Amiga 500 doesn't come with an RF device to connect it to a TV, and it has no way to connect to your Commodore 1702 or early monitors. This may make some 64 or 128 users shy away from an AMIGA, since an AMIGA monitor costs $300.

Well, here's some great news!! CREATIVE MICROSYSTEMS INC.,10110 SW NIMBUS #B1, TIGARD, OR. 97223, (503) 684-9300 sells a device called 'VI-500' for $79.95, which allows you to use the AMIGA 500 with your 64 or 128 monitor!! And they sell 'VI-500 RF' for $99.95 which allows you to hook your AMIGA 500 to a TV! I hooked my AMIGA 500 to a 19" color TV.

It was incredible! I had no noticeable distortion! It turned my AMIGA 500 into a true ARCADE machine with the big screen! This product is super! My brother and I couldn't tell the difference between the AMIGA monitor and the TV, except the TV has a big screen like arcades! So, go ahead and get your AMIGA!

Robert W. Benjamin
Wysox, PA

Dear Sirs:

The Laurel-Bowie (Commodore) User Group has recently held elections and now has new officers. Please include the following in your user group listing.

Laurel-Bowie User Group, supporting the Commodore 64, Commodore 128, and Amiga. General meetings on the third Tuesday of each month, at the Bowie Community Center, Bowie, Maryland.

L-BUG has an extensive public domain library for use by its members, a monthly newsletter, and several SIGs. We may be contacted by calling Rose Ragan, Public Relations, at (301) 498-8686.

Officers:

President:	Rick Carrick
Vice President:	Lee Wiseman
Sect'y Treasurer:	Scott Doiron
Librarian:	John

Frostbutter

Newsletter:	Joe Johnston
Public Relations:	Rose Ragan

Thank you for your assistance.

Sincerely,
Rose Ragan
Laurel, MD.

EDITOR:

This is an open letter to let the AMIGA community know of our existence and an invitation to those in our area to join.

We are currently the AMIGA SIG in SO. Burlington, Vermont. We meet once a month (usually the third Wednesday at 7PM). We are discussing plans to break away from the host (C-64-128) group and form our own club/users group in the near future. These plans will not affect our meeting time or place. Our experience base runs from new owner to advanced users (i.e. we have something for most every one).

If you would like more information, or would like to join our group, please contact me:

DOUGLAS A. RUDD
P.O. BOX 103
UNDERHILL, VT. 05489

Thank you for the publicity.

Sincerely,
Douglas A. Rudd
Underhill, VT.

Dear AC:

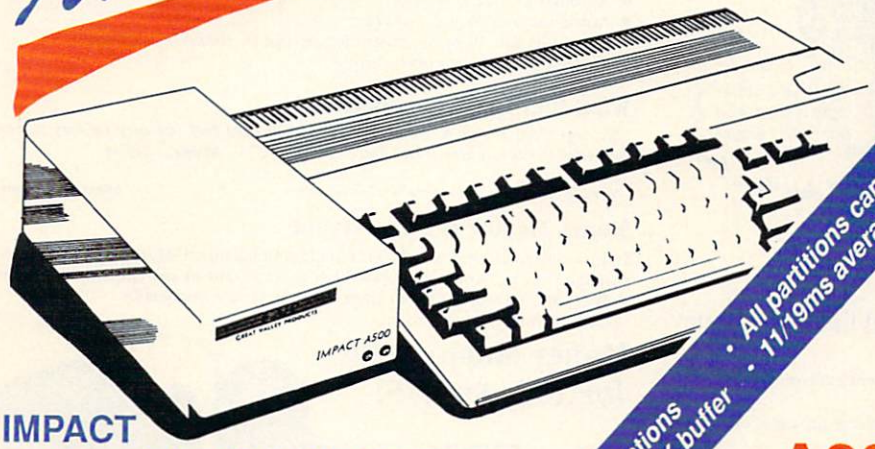
The debate over "ROOMERS" in the Letters column is getting almost as good as the "ROOMERS" column itself. Having followed it for the past several issues now I feel the need to inject the opinion of a developer on the matter.

(continued)

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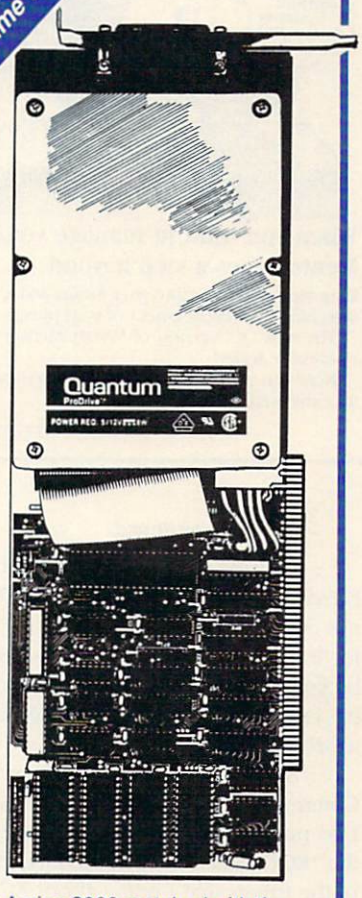
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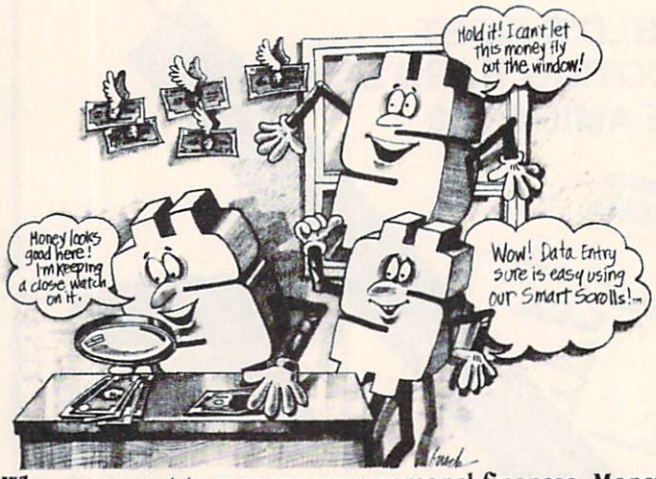
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(Letters, continued)

First, let me CLEARLY state that the Editorial in the last issue (Dec. '88) did not in any way change or alter my feelings on the matter. The Editor is to be commended for saving me from having to write a very long letter, as I agree with the points he made.

As a registered developer with Commodore-Amiga, I can safely say that I do not feel the least bit threatened by the "ROOMERS" column. In fact, it's one of the things that I enjoy about AC. AmigaWORLD would NEVER see fit to publish such an informative column, and if they did, they would immediately drop it after receiving one angry complaint from a developer or company. It would not matter to them one bit what the readers thought. I can say all this from having had some less than desirable "adventures" with AW.

I would love to see "The Bandito" (whoever he/she is) mention a product of mine. True, I am not well known but I am learning, and I expect to make an impression in this market someday soon. I find the information useful in two ways: (1) I can find out what MIGHT be coming out soon from other companies, which helps me to plan my development efforts, and (2) I feel as if I am getting a "working" opinion (The Bandito), who obviously knows what he/she is talking about.

What really steams me is the fact that the companies feel like they have the right to avoid this kind of information release. Future products and innovations from popular companies are obviously "leaks" in the organizations themselves and whose fault is that? It certainly isn't The Bandito's and it certainly is theirs. Frankly, most of the developers I've talked to or had dealings with act like they have swelled visions of grandness anyway. They think that just because they are "registered" or because they work for Aegis or Electronic Arts that they are the pulse of working America when it comes to computers.

I could go on and on and...but that doesn't solve the problem. It just places blame. The best solution, the real solution, and the only solution is to continue to carry the "ROOMERS" column, despite the feelings or opinions of the developers. As the Editor mentioned in the last Editorial, if the developer/company wishes to air their side they can write a letter to that effect. I highly doubt he has received any letters since then and I highly doubt he ever will. I can assure him that if I feel the need to air my opinion based on a "ROOMER" concerning my company that I will write, and I know that my opinion will be presented. Then the reader can decide.

I do not feel threatened by "The Bandito" or "ROOMERS". "The Bandito" is just another person, no more or less than anyone else, who provides a very good, informative column in a very good and informative magazine. Period.

While I am writing I would also like to mention two other things. First, if any Amiga user (who is not a programmer) has an idea for a program I would appreciate their contacting me at: 306 Arbor Drive, Lexington, NC, 27292. Second, I want to mention a new Amiga BBS we have started as a result of our new users group here in Lexington. Mega-BYTE is a mostly-Amiga BBS with 11 file/message sections. These consist of

(continued)


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eight file areas divided for Amiga categories and one for all computers, a private mail section, an open messages section we call GrapeVine, and a Section specifically related to our club, The NETWORK. We are in the process of adding hard disk capacity at this time so our file areas are not that large right now, but our message areas are getting more activity. We are planning a 25MG hard disk initially with an additional 30MGG sometime later and ANSI Color Graphics are also soon expected. I can also be reached on Mega-BYTE as Greg Epley or as SYSOP if you need to leave messages. The Specifics are: Mega-BYTE, (704) 798-3431, 1200/2400 baud, 8n1, 24 hours a day.

Sincerely,
Gregory Epley
Second Sight
Lexington, NC.

Thank you for the nice words. The response we have received from readers and Amiga developers to the addition of editorial asides in ROOMERS has been very complimentary.

We have found some errors by the Bandito, but his information has usually been correct. Our biggest concern is with companies who will not respond to our telephone calls. We want to be fair and we cannot accomplish this without a balance of both sides of an issue.

The majority of Amiga developers have been extremely helpful and they appreciate our concern. The current ROOMERS column required calls to Epyx and CinemaWare. Both companies responded honestly and completely. Each complimented AC on its concern for the whole truth. This has made our efforts a great deal more enjoyable.

ROOMERS does provide a service to the Amiga community. Not everyone will agree to the column's slant with each issue, however all are encourazged to express their concerns. We want to hear from all parties and welcome their letters. It is good to see the Amiga community has responded so openly.

Dear Sir,

In your November 1988 issue, you published a letter from Mark Delcogliano under the title "Speedy Startup". The first advice concerns using full path name for commands and files in the startup-sequence file.

I had the following commands in my startup-sequence file:

```
...
if not exist ram:c
makedir ram:c
endif
...
```

which I then faithfully proceeded to modify to :

```
...
sys:c/if not exist ram:c
sys:c/makedir ram:c
sys:c/endif
...
```

When I tried to reboot, the batch file aborted saying that there was an illegal IF statement.

After quite tedious debugging, I finally pinned down the culprit and the ENDIF statement. The corrected version appears below:

```
...
sys:c/if not exist ram:c
sys:c/makedir ram:c
endif
...
```

Apparently, the AmigaDOS operating system has been programmed to search for an "ENDIF" to follow an "IF"" statement. It is not clever enough to recognize a variation like, for example, "sys:c/endif".

I hope this contribution is of assistance to some of your readers. Keep up the good work in the new year and thank you for an excellent publication which I've thoroughly enjoyed reading every month in the past year.

S.J. Gan
England

Dear AC,

Guess, I'm going to have to do it, looks like nobody else is going to. So, here it is.

NOW HEAR THIS!

There is a CHEAP, CHEAP disk holder on the market, that will hold 50 disks and is totally dustproof and watertight.

Now, have I got your attention?

It's made by Rubbermaid and is called a Servin'Saver food container. Get the 12 cup size, the one with the 6 in a square on the bottom. It will hold 5 boxes of disks very neatly. Might do as I do and label the tops of the boxes 1-10, 11-20, etc., you get the picture. Also, if you use a desk with two big drawers on the bottom, the containers will rest at about a 33 degree angle to your chair.

All this, for a price of just $3.86.

What more could you ask for?

Your Friend,
Danny Barton
Olla, LA

P.S.- Leave the Bandito alone !!! He has a better track record than INFO, I have been keeping score!

Dear AC,

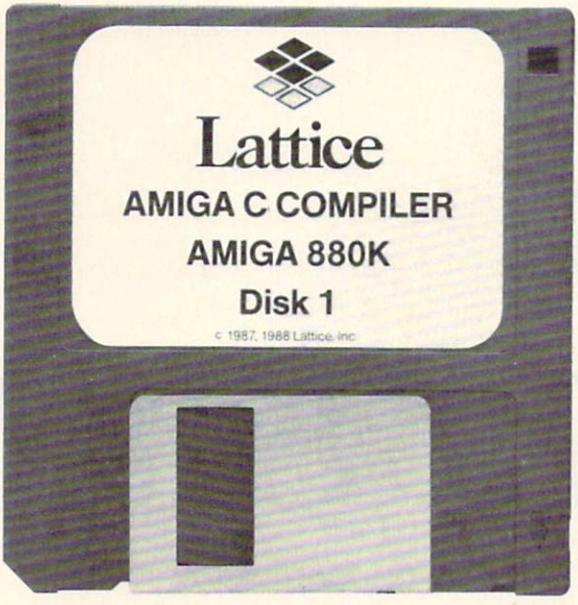
Thanks to Robert D'Asto for the informative article on Graphic Objects in AmigaBASIC V.3.10. One statement in the article is misleading and I would like to save other experimenters some frustration. Robert states "...AmigaBASIC doesn't use 16 bit bricks to construct bobs. It uses 8 bit ones instead." The DATA statement does accept the decimal equivalent of the 8 bit bricks; however, the object appears to be constructed from pairs of the 8 bit bricks. OBJECT SHAPE returns "Illegal Function Call" if an odd number of 8 bit bricks are specified with the width parameter. The last 8 bit brick in a row can be less than 8 bits in the width parameter, as long as at least one bit of the "even" brick is defined. When translating a partial brick to decimal, the leftmost bit is still equal to 128.

I look forward to more issues of AC full of interesting articles and timely reviews.

Sincerely,
Brian R. Mayer
Dearborn, MI.

•AC•

IN SIDE-BY-SIDE COMPARISONS,





LATTICE BLEW MANX AWAY.

Introducing new Lattice C for Amiga DOS, Version 5.0.

Lattice C 5.0 is the fastest compiler by every measure. No other language, no other compiler, gives you faster, more efficient programs. And it now supports 68020 and 68881.

BYTE* Benchmark	Lattice C 5.0	Manx C 3.6	% Difference
dhampstones	42.4	62.7	32%
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scbigrd	70.2	82.8	15%
sorto	76.4	110.9	31%
sieve	34.4	40.5	15%

And no other compiler gives you a more complete programming environment. This package includes:
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AMIGA...

&

The Right Stuff

AC tests the mantle of three combat simulators.

With apologies to Tom Wolfe...

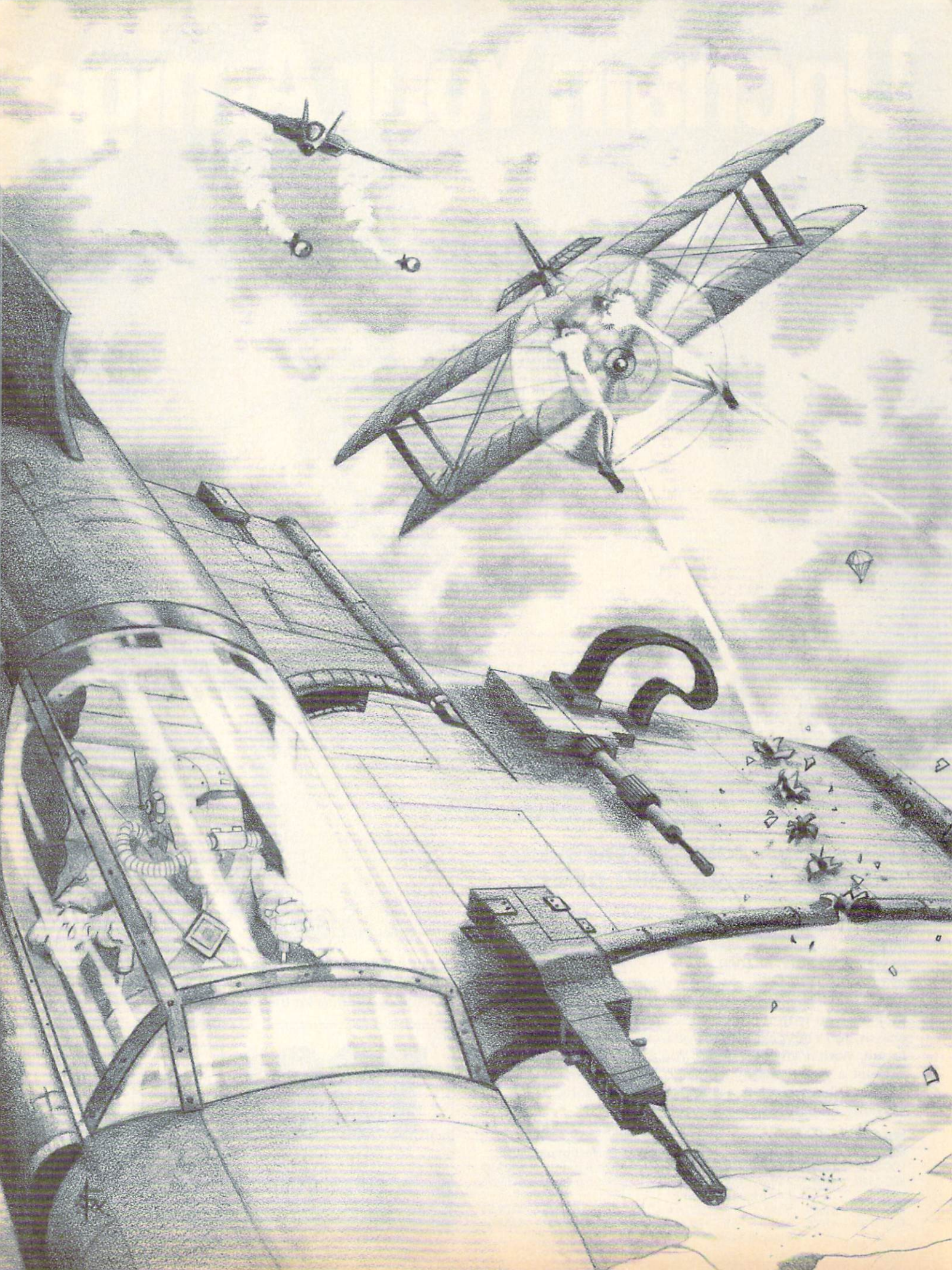
In the world of Amiga games, as in real life, nothing typifies sheer courage and bravado like flying your own fighter plane through enemy swarms in an insatiable quest to determine whether you have the right stuff. To succeed as a real-life fighter pilot, you'll need the eyes of an eagle, the heart of a lion, and the nerves of a surgeon. For those of us slightly lacking in any of the above, the Amiga gives us the next best thing: flight simulators. From the Amiga's hangar full of flight simulators, AC has chosen three units that are sure to test your flight nerves.

First, Joe DiCara strapped on *Spectrum Holobyte's* **Falcon** for some high altitude, high intensity, air adventures. According to Joe, Falcon is a flight simulator with "all the right stuff": replay, flight mapping, and training scenarios. Falcon puts would-be fighter pilots to the war games test.

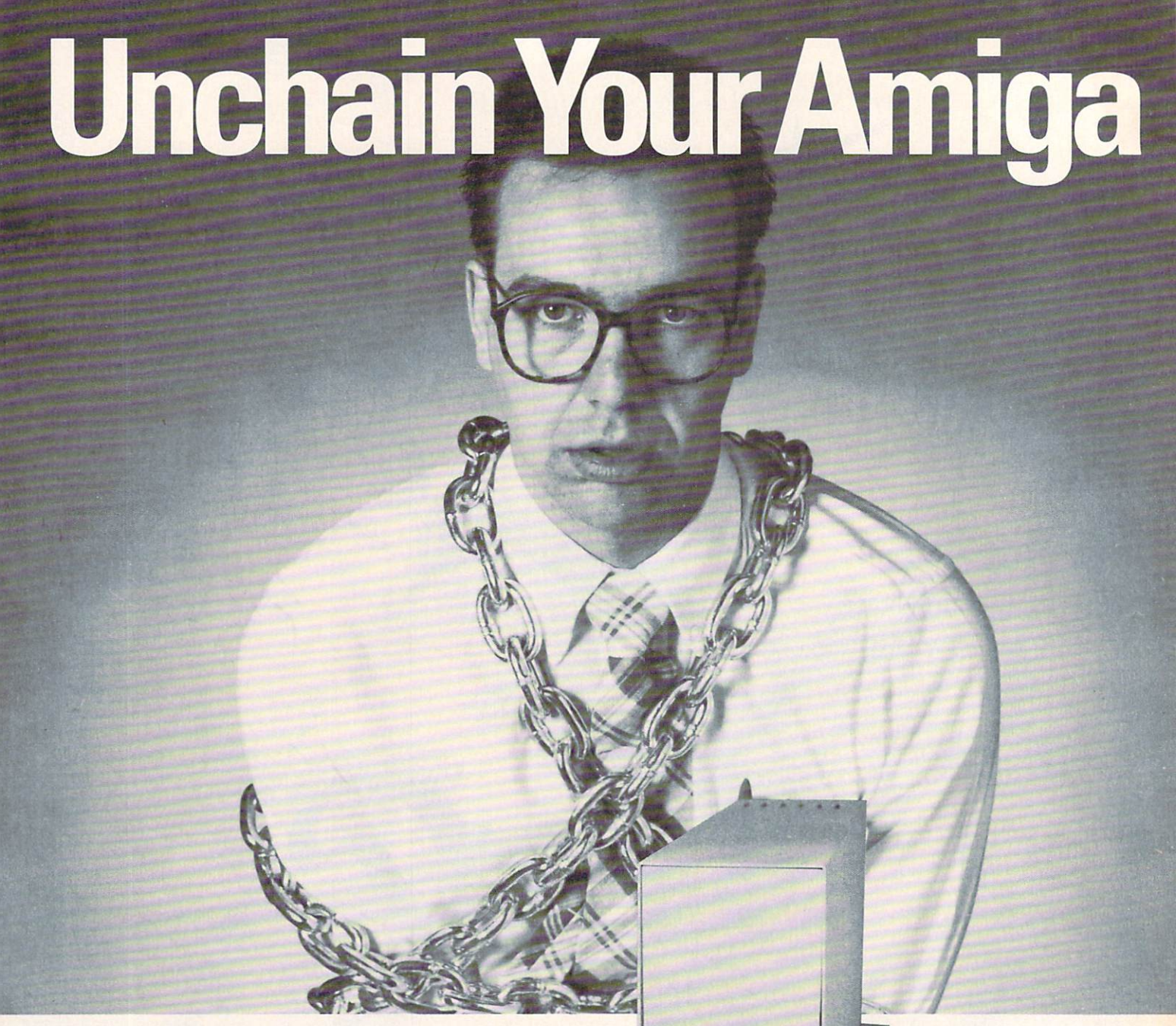
Then Michael Mantino logged onto a multi-player, online air battle with *Kesmai Corporation's* **Air Warrior**, an interactive flight simulator and air combat game which allows players from around the world to battle it out via modem, piloting their choice of WWI or WWII planes.

Finally, Lawrence Lichtmann signed on for a stint on an aircraft carrier for his review of **Carrier Command**, *Rainbird's* aircraft carrier battle simulation. First, build up a supply network by capturing islands. Then build your network of supply and defense islands, carefully deciding what each island will produce.

These are just three of the many flight simulators in the Amiga squadron. From *SubLogic's* **Jet** and **Flight Simulator II**, to *Electronic Arts'* **Interceptor**, you're sure to find something that will let you know—in no uncertain terms—if you have the right stuff.



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EEC-2110	A1000	None	$4^5/_8$ x 6 x $14^3/_4$	1 amp off bus *	$179.95
EEC-2120	A1000	2 amp @ +5V 1 amp @ +12V	$7^1/_4$ x 6 x $14^3/_4$	Not required	$259.95

*Call for complete information (no chain mail please).

Now with all these models it's easy to link your A500 or A1000 to the wide variety of A2000 cards available, but if you're having trouble choosing give us a call. We'll be happy to give you more information on the ToolBox or any one of the other great products that Expansion Technologies offers for the Amiga family of computers.

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from Spectrum HoloByte

Falcon

F-16 Fighter Simulator

review by Joe DiCara

Right from the start, the Amiga looked like a natural for flight simulation programs. After all, the Amiga was the state of the art graphics and sound machine with lots of colors, high resolution screens, a great sound chip giving four channels for digitizied or synthesized sound, plus speech capability. I was looking forward to highly detailed, fast moving scenery, animated targets and objects, tower and ground control instructions, and multiple players or targets.

One of the first demos my dealer showed me was Radar Raiders, by Bruce Artwick. This was a beta version of what was supposed to be the Amiga's first flight simulator. I was immediately sold on the Amiga. Not long after that, I was the owner of both an Amiga 1000 and, after much begging, a copy of Radar Raiders.

The jet modeled in Raiders handled very well and sounded great. It used the mouse as a pseudo analog control stick and throttle. There was nothing to shoot at, and very little scenery to view. Still, it was a beginning. Unfortunately, Radar Raiders never made it to market. So the Amiga community waited.

Almost a year later, Flight Simulator II was released by SubLogic. From a pilot's point of view, it was what we had been waiting for. It had full instrumentation and navigational aids, good graphics and sound, as well as easy, yet realistic handling. It was not perfect, however. After all, it was a port across the three 68000 machines, of which the least common denominator was the Atari ST. So graphically (frame rate, colors, resolution), it was disappointing. But at least now we were "really" flying. Actually, it still is the Amiga's only true flight simulator. I still enjoy it. You can even have air races with it. Just hook two Amigas together via direct cable or modem, then select Meigs field in Chicago. Use the Sears Tower and the other large buildings for pylons, take off together, and do five laps. The first to land safely back at Meigs is the winner.

But we still couldn't shoot anything. The WWI portion of FSII was a throwback to 8 bit machines. So, who would be the first to release a true fighter simulator? About a year later, SubLogic released Jet. At last an aircraft "shoot 'em up". It was fun, and via cable or modem, you could finally shoot someone down. Gone were most of the instruments and flight realism. Jet also suffered from its commonality with the lesser 68000 machine. Frame rates were slow, targets were not realistic and easily destroyed, and electronic counter measures were non-existent. Yet, Jet fulfilled the promise of Radar Raiders, and raised the level of flight simulators a notch.

(continued)

Here, at last, is a fighter simulator that has all the right stuff.

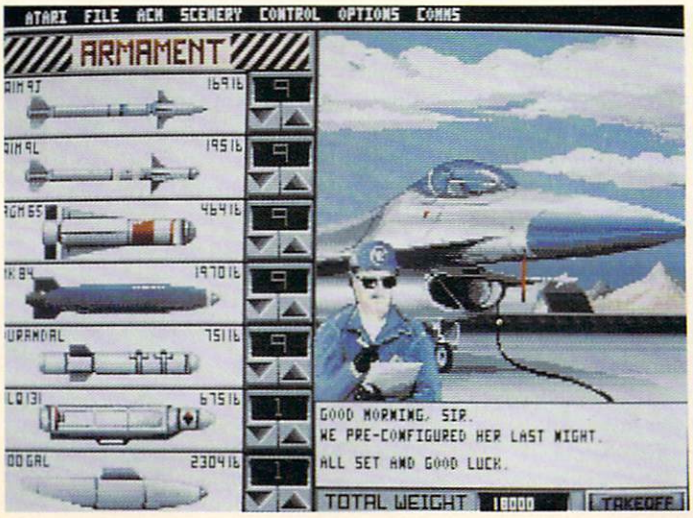


Figure One (left) *Choose your weapons at the armament selection screen.*

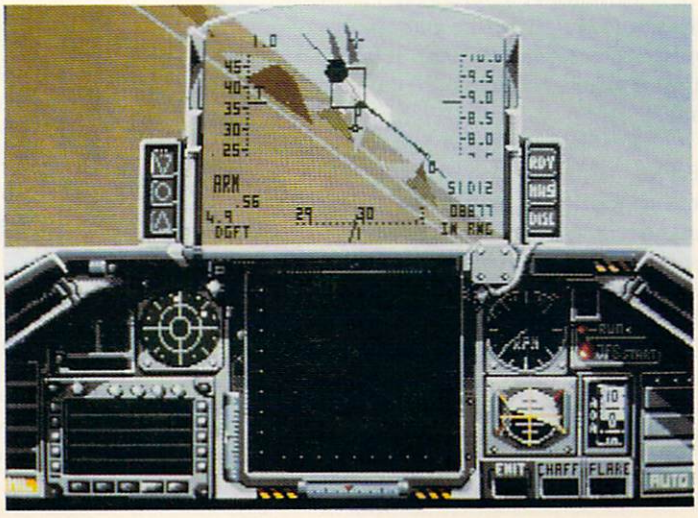
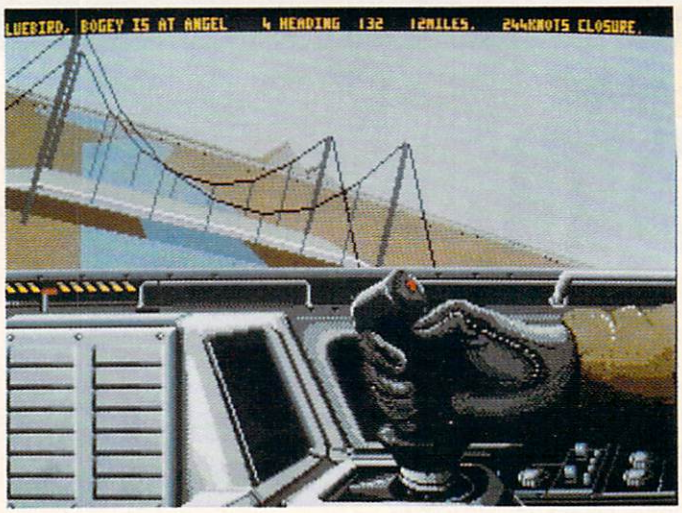


Figure Two (right) *The forward head-down view shows half instruments and half sky (including the HUD).*



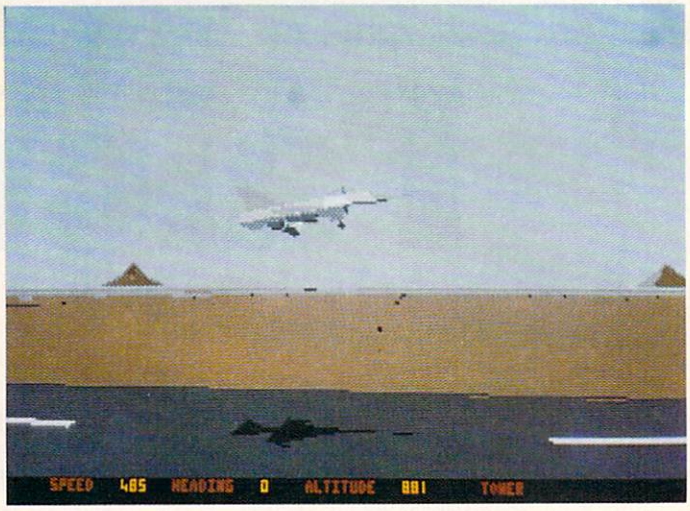


Figure Three (left)
Press 7 or 9 to view the left and right sides of the cockpit.

Figure Four (right)
It is possible to land as described, but only after reading how to do it, and then practicing a good deal.

Within months of Jet's release, a demo began to circulate that absolutely electrified the hearts of all would-be jet jockeys. The preview demo of Electronic Arts' F-18 Interceptor promised to be the simulator that might finally push the Amiga to its limit. We were not disappointed, and from the sales results, I gather Electronic Arts wasn't either. F-18 immediately became the benchmark for all combat flight simulators, and I believe it still is. Whenever I want to impress visitors, I simply fire up F-18 and watch their amazed reactions.

Now with the release of Falcon by Spectrum HoloByte, the ante has been raised to a new level. Here, at last, is a fighter simulator that has all the right stuff.

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Well, if this is what you're looking for, Falcon F-16 is a must buy. Is Falcon the ultimate? Is there room for improvement? Well, read on.

Open The Box

Falcon is a two disk program. The instruction manual is a well written, fully illustrated 130-page document. The program runs on any 512K Amiga using 1.2 Kickstart or higher, and one 3.5" disk drive (512k owners might have to disconnect any additional drives). If you have one megabyte, Falcon will reward you with more sound and better graphics. An extra drive does let you avoid some disk swapping. Falcon uses a code wheel for copy protection, so the disks can be easily backed up. Only two insignia icons displayed on screen need to be matched on the code wheel to verify you as an official owner.

Upon bootup you are presented with a screen similar to the graphic on the box, the code wheel screen and, finally, the Duty Roster screen. This last screen gives you the status of each pilot and, as the manual says, "it includes all pilots still alive" (a warning of hard times ahead for rookie pilots). I like the roster because it allows up to ten different players to use Falcon. Unlike F-18, you do not need a separate disk for each person's statistics.

The next screen allows you to select one of five ranks, from 1st Lieutenant to Colonel. These ranks determine the level of difficulty. Please, don't try to be a hero the first time up. Pick 1st Lieutenant. At this level, you receive unlimited weapons, a super engine, and nothing can destroy or hurt you. But you can destroy everything and anything you see, even the other F-16. Also on this screen, you select one of twelve missions. One of my favorites is Dragon's Jaw. It requires use of the MK84 2000 pound bomb to destroy the cantilever bridge while, of course, you dodge Migs and SAMs. It's a tough target.

Click on "OK" to see the armament selection screen (see figure one). At Lieutenant, you're already loaded for Bear. For other levels, you must select the ordnance based upon the mission. The crew chief will inform you of the bird's status, and provide you with some words of wisdom. Before you exit this screen, select the control mode. With this version of Falcon, you should select joystick or keyboard. Do not use the mouse options (I'll explain later).

Now select takeoff and soon you'll find yourself in the office of the F-16. The instrument panel of this bird actually occupies three screens (see figures two & three). Press 7 or 9 on the keypad to view the left and right sides of the cockpit. An interesting feature of Falcon is the ability to look up or down inside the cockpit. In the default views, looking in any direction gives a head-down view, half instruments, half sky. If you press the bracket keys, you'll toggle between these two views. The head-up view is all sky. Looking forward, one sees only the Heads Up Display (HUD), and the sky beyond. During aerial combat, the full sky view helps track the enemy. Nice touch.

After you've scanned the panel you will realize that the keyboard is going to be an essential element in the operation

(continued on page 34)



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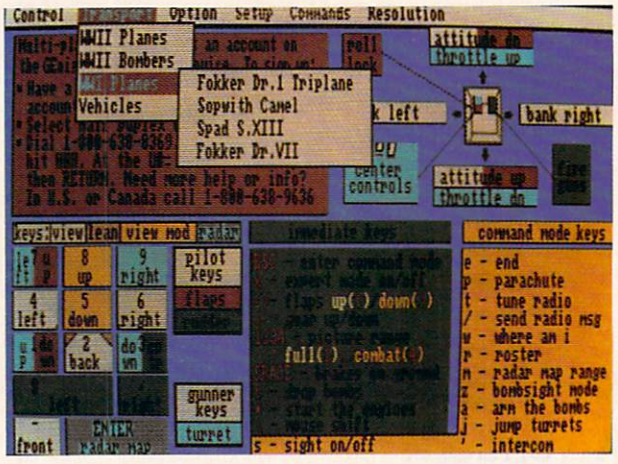
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AIR WARRIOR

MultiPlayer Online Flight Simulation
World Wars I and II

by Michael Mantino



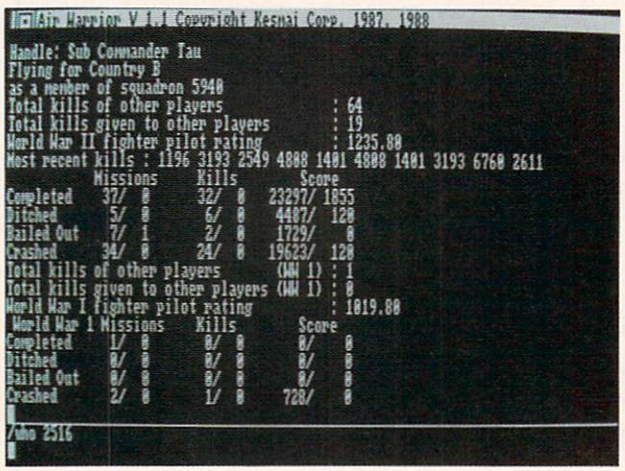


Figure One *(top)*
Setting the game parameters.

Figure Two *(bottom)*
Air Warrior terminal mode.

Ahead to the Past

The quiet hum of my Spitfire's 1,710 horsepower Merlin 60 engine did little to offset my nervous anticipation of the impending mission. As the plane taxied down the runway, I could clearly see the anti-aircraft gun emplacement off to the left, the stoic defender of airfield B-3. Directly behind me, my wingman had just started rolling down the same asphalt strip. About 2,000 feet south, the main body of the primary attack group was forming up. Trying hard to calm my nerves, I set about the standard system checks as I rolled out toward the group. Gear up, flaps check, ailerons check -

Just then the radio crackled to life with the voice of Group Captain Stewart.

"Okay gentlemen, come to Angels-10 and form up on me."

Acknowledging the command, I positioned my Spit and glanced off to the west to ensure the remainder of the flank was in place. It was difficult not to notice the B-17G bomber tucked neatly under my left wing. Housing six of our country's best turret-gunners, the bomber's 103-foot wingspan blocked much of my ground view.

This particular mission entailed escorting the bomber to a predetermined enemy airfield, destroying any anti-aircraft gun emplacements and ground vehicles, bombing the runway and buildings, and providing air support for the bomber's safe return home. With this in mind, we cruised south toward the enemy border, still some nine miles from our destination.

It was my wingman, Dale, who first caught glimpse of the lone aircraft due west of our position.

"Single bandit - three o'clock and low," he radioed.

The unknown nature of this plane's intentions prompted a look-see on our part. Dale and I were sent to investigate, and confront if necessary. We broke away from the pack and made our way west, keeping a 1,000-foot altitude advantage on our target. The aircraft appeared to be a Mitsubishi A6M5a Zero out on a solo recon patrol, Apparently, it had not yet noticed our presence.

Because of the Zero's astounding turning capabilities, we decided that Dale would dive quickly on its tail and do as much damage as possible. Meanwhile, I would lay back about 900 feet, and catch the bogey broadside if he tried to make a break for it.

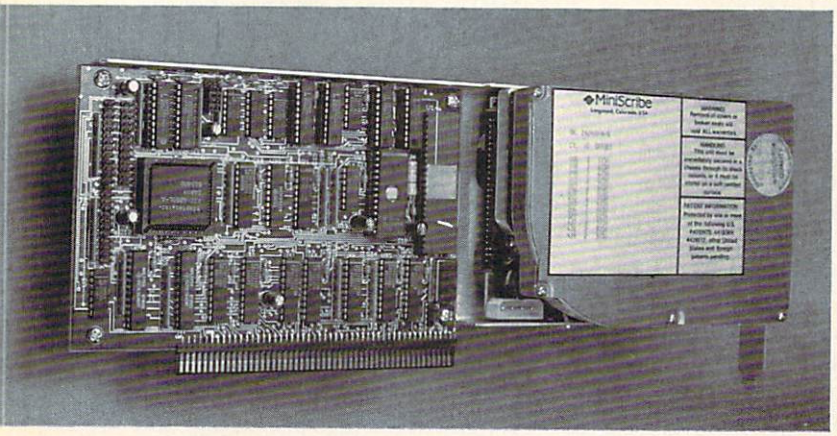
Unfortunately, about 2,000 feet from the enemy, we were rudely apprised of the fact that this guy had, indeed, been keeping a watchful eye on us. Still out of my gun range, he made a quick turn and headed straight for my partner.

They passed each other, guns blazing, and before I knew it, the Zero was dead ahead, ready to make Swiss cheese out of my Spit. We exchanged fire on the initial pass. Luckily, I wasn't hit. As I turned, I could see our prey grabbing as much sky as he could, with Dale right on his six. Turn completed, I followed them south toward the border, opting for a slower rate of climb in order to gain some speed.

(continued)

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"I think I put a few holes in those rice paper wings of his," Dale announced, "but he managed to do the same to me. I've lost some wing surface."

Before I could reply, the bogey had caught his first glimpse of our large bomber squadron sitting directly between him and the safety of his airfield. Without hesitation, he furiously dove in the southern direction.

"He's hitting the deck, Dale!," I cried, "I've got a speed advantage, so pull up behind me as I pass you."

"Roger. Looks like we've got him now," bellowed my wingman. It was common knowledge that a Spit would out-dive a Zero in most cases, so the scales had once again tipped in our favor. Losing altitude fast as I followed the bogey groundward, it was imperative that I keep an eye on my speed or risk losing a wing or two.

Finally, he was within range of my twin 20mm cannon. I let off a few rounds. I saw one hit on his tail section and glanced at my gauges. We were dropping too fast, and the altimeter showed us dangerously close to the open field below. I brought my rudder out a notch, and eased back on the throttle. The Zero came level at about 100 feet, straining for speed. I responded by retracting the flaps, giving it the gas, and pulling in comfortably behind him. Only 500 feet away, my next shots ripped through his fuselage, releasing an acrid gray stream of smoke. Seconds later, he was careening into the countryside, unable to bail out to safety.

"Bingo!" came Dale's voice, "Nice shooting. Now plant yourself on my wing and walk me home. That rat caught me in a soft spot. I'm losing oil."

"Roger. Head 010 at 1,000 feet, and I'll inform Stewart," I sighed.

I would miss the bombing run I had been looking forward to. But I would receive just as much satisfaction in escorting Dale back to base, repaying him for the countless times he had gotten me out of a jam.

About 5,000 feet away from our runway, Dale, his oil depleted, informed me that his engine had given up the ghost. We all had vast experience in ditching a plane, so I hadn't a doubt he could handle the situation. I called in to HQ with the details, and winged my way into the airfield. It wouldn't be long before we were both buckled into new, refueled Spitfires, heading back to run interception for the returning squadron.

World Wars I and II may have ended years ago, but to many thrillseekers with a sense of nostalgia, both wars are alive and firmly entrenched in an electronic battleground on the General Electric Network for Information Exchange (GEnie). A product of the Kesmai Corporation (founded in 1981 by Dr. Kelton Flinn and John Taylor III), Air Warrior is an interactive, graphics-oriented battle game and flight simulator that allows many users to participate at the same time.

The scenario presented above is just a sampling of what occurs daily in this huge simulated world comprised of three countries continually at war, and well-equipped to defend their homelands or launch deadly offensives against one another.

Sophisticated software running on both the user's computer and GEnie's system provides some very unique features not found on current commercial flight simulator games like JET and INTERCEPTOR, the most striking feature being the ability to fly with and against multiple human opponents.

On an average night, anywhere from 30 to 40 users will be airborne or jeep-bound, some in pursuit of the "most kills" record, some with a desire to experience what it is like to fly a P51D Mustang or Sopwith Camel, and some who enjoy the confrontation and camaraderie. The reasons are as endless as the situations that exist, and options that are available.

Obtaining the Software

Presently, Air Warrior is available exclusively on the Apple Macintosh, Atari ST, and Amiga computer systems (an IBM version is now under development). Each has their own specialized software packages which take advantage of the individual machine's unique capabilities. Unless otherwise noted, throughout the remainder of this article I will be referring to the Amiga version of Air Warrior, programmed by David Albrecht.

The package requires at least 512K of memory to run, but if you have 1 megabyte or more you, will be able to take advantage of non-essential but aesthetically pleasing features. The software can be obtained by simply downloading it from GEnie's Air Warrior software libraries. Because it is freely distributable (with limited restrictions), you may even be able to find it on your local non-commercial Amiga bulletin board system.

A user's manual and update/version notes are also available in these areas. Both should definitely be scrutinized before attempting to fly. Unfortunately, the documentation is not nearly as encompassing or detailed as it should be, considering the breadth of the simulator itself. Still, it does cover many of the less extravagant features.

Practice Mode

The Air Warrior software actually contains three distinct segments: Practice Mode, Terminal Mode, and InFlight Online Mode (for lack of a better name).

You begin by booting up the program using the WorkBench icon provided (You run it from CLI if you are so inclined). You are presented with a colorful reference screen displaying keyboard assignments and mouse commands. It is here, in Practice Mode, that you can enter other portions of the program, or simply grab a plane and begin flying. You will not have guns or bombs at your disposal, but you can gain flying experience without wasting money on GEnie during your initial training.

A standard Amiga menu bar is provided across the top of the screen, with a variety of interesting options to choose from. Many are simply toggle switches for things like Bombsight, Gunsight, Visible Tracers, and Indicated Airspeed, but the remainder warrant a closer look.

The Air Warrior software is designed to be open-ended in a number of areas, especially sound and graphics. Whenever a pilot starts a plane's engine, crashes a vehicle, bails out, etc., a digitized sound sample is pumped out. These samples are kept on disk until you request any or all of them to be loaded into the program using the Sound Options menu item. You can download a variety of samples from the GEnie libraries, or even concoct your own and place them on the Air Warrior disk, provided you have access to a digitizer.

The Air Warrior software also provides the user with methods of loading in their own aircraft artwork, instead of using the default 3D gray

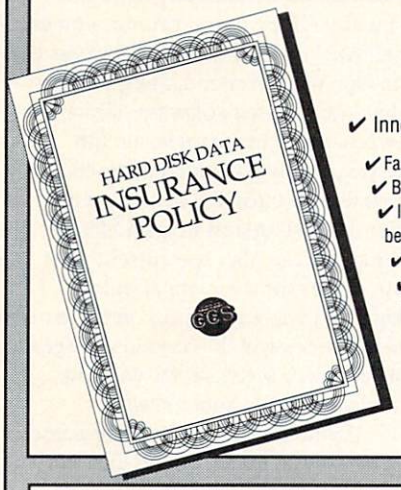
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polygon silhouettes. While flying a plane or driving a jeep, you can look around your vehicle, and while the drab gray wings and cockpit may be just fine for some folks, others may want their planes to appear as realisti— or as wildly tacky—as possible. Artwork can be designed with just about any paint program, and then converted into compatible format through an available utility program. Again, numerous customized art files are available on GEnie for your enjoyment.

The last option in Practice Mode, before we get to the planes themselves, is the choice of screen resolutions. There are eight in all, covering a variety of bitplanes and colors: LoRes 3/8, LoRes 7/8, Lace 3/8, Lace 7/8, MedRes 3/4, MedRes 1/4, HiRes 3/4, and HiRes 1/4. When any of the features already discussed are toggled or otherwise manipulated, the change is saved immediately to disk. The same will be true of other options we will examine in Terminal Mode.

Once you have selected all your default settings and placed your monitor in a resolution you enjoy, it is time to select a vehicle. Here is another area where Air Warrior outshines most commercial flight simulators. You have your choice of one of sixteen different vehicles, all of which are designed from ground up, with historical data being the prime consideration in their flight characteristics. Consider this list:

WORLD WAR I PLANES:

Fokker Dr.1 Triplane
Sopwith Camel
Spad S.XIII
Fokker Dr.VII

WORLD WAR II PLANES/VEHICLES:

P51D Mustang
Mitsubishi A6M5a (Zero)
Messerschmitt Me 262A-1a
Focke-Wulf 109A-8
Hawker Hurricane Mark II
Vought F4U-1D Corsair
Spitfire Mark IX
Messerschmitt Me 109G-6
Standard Jeep

WORLD WAR II BOMBERS:

Boeing B-17G Flying Fortress
North American B-25H Bomber
Douglas A-26B Invader

Not only are these planes historically accurate in their rates of climb, maneuverability, turning capabilities, and diving speeds, they also have their own distinct and realistic armor ratings and armament supplies. For instance, while the Zero will outmanuever a Focke-Wulf almost every time, it cannot survive as many hits, or dish out as much damage, as the FW can. It is this attention to detail and realism, along with the wide variety of aircraft, which contributes greatly to Air Warrior's appeal.

Now imagine being able to hop aboard a B-17 bomber piloted by someone else, then taking on duties in one of the many gun turrets! To really get an idea of what it will be like flying or driving while online, choose any vehicle while in Practice Mode, and you will immediately be brought into the flight simulator at a predetermined airfield.

Because no armament is active offline, this mode is used primarily to practice taking off, landing, ditching, aerobatics, and maneuvers with a variety of planes before you ever attempt to connect with GEnie. Keyboard commands (similar to Flight Simulator II) and mouse control of the planes or jeep should be of primary interest in your training. The multi-player online world can become very hectic for a new user during the busiest peak periods. Learning as much as possible, without the threat of constant enemy harassment, is the smart thing to do.

Terminal Mode

When your training is complete, you will want to connect with GEnie and test your mettle against pilots calling in from across the U.S., Canada, Europe, and Japan. Simply choose the Terminal Mode menu item from the Practice Mode reference screen, which will bring you into a basic terminal program similar to many in the public domain. It will contain the options necessary for setting up your terminal and modem. Note that the host is set up to run the simulation at 1,200 baud. Though you may enter the simulator and fly at 2,400 baud, there will be no significant advantage to doing so.

The terminal program lets you set a Dial String for placing the phone number and dialing commands, a "chat" window at the bottom of the screen if you so desire, and a Dial command. While obviously lacking in features such as Redial command, transfer protocols like Xmodem, any kind of text buffer, and macro capabilities, it does well as your basic terminal, and allows you to get on and off line easily.

Naturally, you will need an account with GEnie to access Air Warrior (see instructions at the end of this article), but I will assume you already have one. From any GEnie menu prompt you can type "AIR" or "MOVE 870" to access the main Air Warrior menu. Here you can delve into the vast software library and download sound samples, aircraft artwork, neatly packaged instruction manuals and tutorials, or any number of other interesting and helpful files. At this menu, you can also see current pilot and team scores for the campaign in progress, you can read up on the current version notes which contain changes in host or micro software, or you can actually enter the game itself.

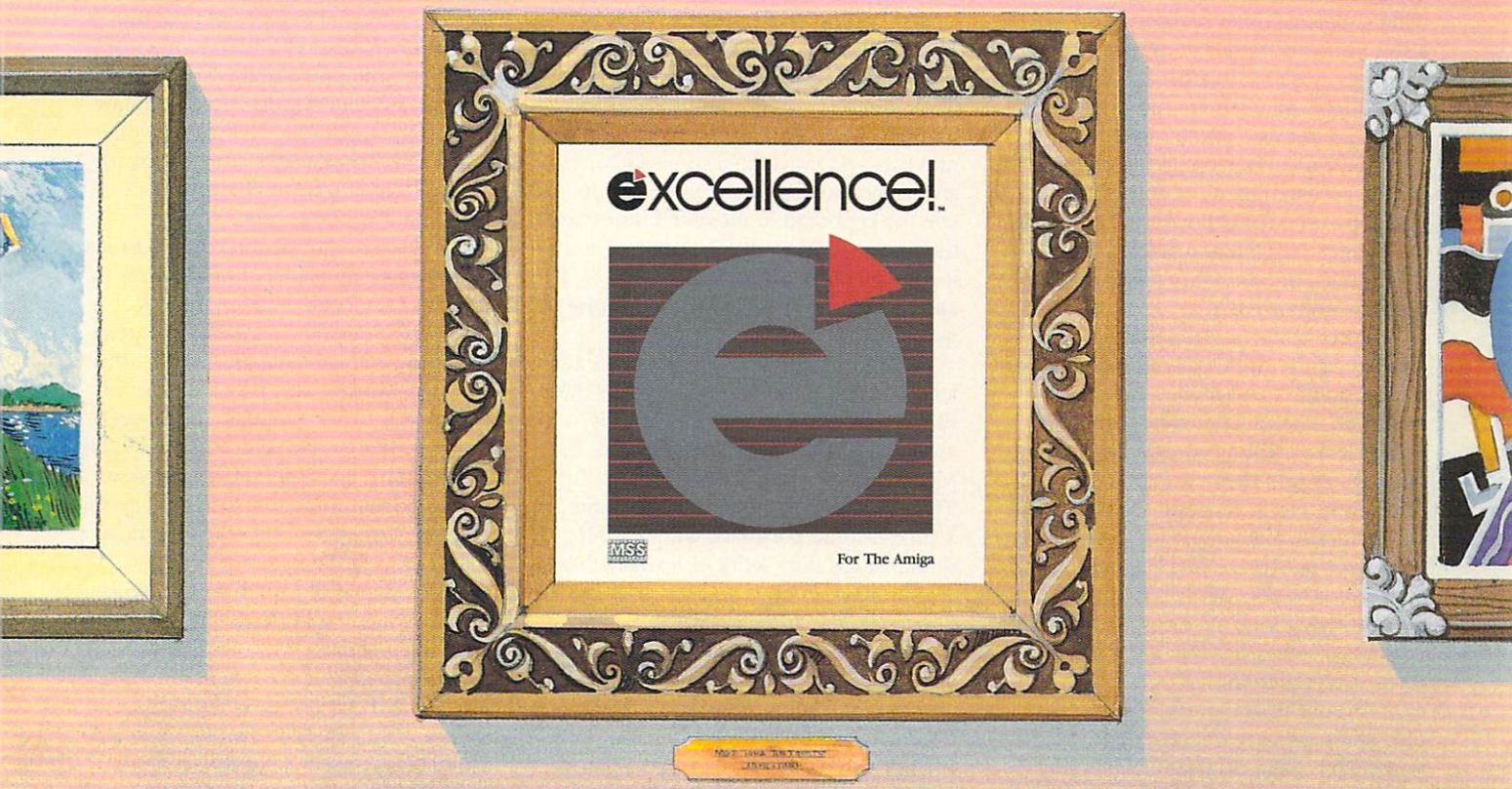
If you choose to enter the game, you are summarily dumped into what is known as the General Conference Room, where players from any country can converse at length. It is also the staging area where you may acquire indepth information about any player (including yourself) using special commands. A roster of current users in-flight, listings of scores and stats, and other useful tidbits are constantly updated and available to all. Help is always close at hand by simply typing /HELP.

Besides choosing a nickname (or "handle") for yourself, the first thing you must do to enter the game is choose a country to join. Currently there are three available countries, apolitically labeled A, B, and C. You will find that each has its own distinct flavor and character, but strategically there is little difference between them except for their respective locations on the map. All countries have the same variety of planes and armament to choose from. Throughout the course of an evening, the ratio of enemy planes to friendly planes will vary greatly, depending on arrivals and departures of individual pilots.

Once a country is chosen, you must reserve one of three available theatres (which can be changed at any time). There are two WWII theaters (since most users prefer World War II

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aircraft), and one World War I theatre. WWI and WWII are physically separated, so planes from one war cannot enter into the area of the other.

Once a theatre is selected, you are placed in that particular country's Headquarters. Here teammates gather to discuss possible tactics, along with a wide variety of other subjects. You may also tune your "radio" to one of 99 channels available to talk with pilots who are in flight. All channels are private and dedicated to those of the same country, except for one. This one open channel can be accessed by all countries, and is generally used for either verbal baiting of the enemy, helping new users acquire their wings, or discussing past or future software enhancements.

Also, while in Headquarters or at any one of the Airfields, you may be lucky enough to be invited into a squadron. Special commands are available for creating squadrons, inviting other pilots into them, accepting invitations, etc. A separate scoring list is automatically maintained for each squad. Whether you start or join a squadron is entirely up to you. Many pilots are content flying lone missions, or following organized squadrons into a particularly interesting situation.

From Headquarters, you choose one of the primary or secondary airfields you wish to take off from. This is yet another staging area with many new commands. It is your last stop before you actually enter the flight simulator. It is here that you choose your plane, its fuel load, its bomb load (some fighter planes can carry bombs, too), or may gather with teammates for final thoughts or remarks.

Up, Up, and Away!

Kesmai has taken care to design their crafts with unique capabilities. Depending on the type of bomber (or jeep) chosen by a teammate, anywhere from one to eight vacant positions are available for teammates to occupy. Special commands are invoked for sending and accepting requests to join a bomber. For instance, a teammate with the pilot #2516 may be taking up a B-17 bomber, and you wish to hop into the Tail Gunners turret. All you do is type: / join 2516 tail. The request would be sent to the pilot and, if he wishes to accept you, he would type in a responding command. You would then be sent a message stating that "2516 has accepted you as tail gunner". This same routine would be repeated by as many players as wished to join, or until the bomber was loaded to capacity.

Besides tail gunner, there may be Upper Turrets, Lower Turrets, Chin Turrets, Ball Turrets, Left Waist, Right Waist, and Co-Pilot (or Navigator), depending on the size and style of the bomber. Some turrets are automatic and move as you move your mouse. Others are manual turrets, which require you use the keyboard to move the turret, and the mouse to move the gunsight. The jeep, which can play a vital role in airfield defense, also has room for one gunner.

At any rate, when the driver of the jeep or pilot of the bomber invokes the / FLY command, everyone onboard is automatically taken out of Terminal Mode, and into the flight simulator. There you are, in the rear of the plane staring out the plexiglas, with the pilot doing all the dirty work of actually flying! All you have to do is assist in spotting enemy aircraft and ground forces, and destroy them with your turret guns. It is also the pilot's job to line up any ground targets in his bombsights and actually drop the load on runways, buildings, jeeps, parked planes, roads, anti-aircraft guns, and any other point-producing location.

Besides the standard radio available to all pilots in flight, bombers contain special intercoms used to communicate with others onboard the aircraft only. No one else can gain access to these communications.

Also, if your bomber does not contain its full load of gunners, or one is killed during a skirmish, you may use a special "jump" command to take control of the unoccupied gun. Needless to say, this method of implementing bombers in a flight simulator is wonderfully distinct and hugely satisfying to the participants.

If you choose to take up one of the other planes, the same /FLY command brings you into the simulator and onto the chosen runway. On the dashboard, you'll find your airspeed indicator, fuel gauge, rudder display, throttle indicator, altimeter, ammo gauge, stick box, oil gauge, flaps indicator, accelerometer, digital compass, rate-of-climb gauge, and stall warning light. On the right side of the dash is your radio area, where messages from other planes constantly scroll by. Also, the channel you are tuned to will be displayed. The rest of the screen consists of your cockpit view of the surrounding landscape and the nose of your plane.

For any plane and most ground targets within 5,000 yards of you, the program will display an ID number of the target, the range of the target, and an icon below your windshield and in line with each target. This method identifies pilots and distinguishes one country's planes from another's. It is also implemented on the radar screen. Keyboard and mouse controls are similar to many commercial flight simulators in the way they handle commands like starting the engines, retracting the gear, obtaining left/right/diagonal views, etc.

Air Warrior also provides special commands to use while the plane is in flight. Holding down the keypad ENTER key replaces your entire window view with a powerful radar screen, and special ESCAPE sequences will zoom the radar in or out in range increments. Other ESCAPE sequences will tune the radio, enable you to bail out of your plane, end your flight session while stopped on the ground, enable/disable bombing, open/close bomb bay doors, and increase/decrease the out-window picture range. Holding down the P key will remove your dashboard momentarily, and display any radio messages that have long since scrolled by.

I could easily fill another three pages discussing the numerous commands available in the different Air Warrior areas, but we must move on.

Damage to a plane is assessed in a number of ways. Obviously, the armor protecting the plane has a great deal to do with damage suffered, but different planes carry different levels of guns as well. For instance, being hit by a Focke-Wulf's four 20mm cannons and two 13mm machine guns will inflict more damage than a Zero's two 20mm cannons and two 7.7mm machine guns.

Depending on the hits incurred, any number of things may happen to a plane in Air Warrior. It may lose power and wing surface, or its ability to move its landing gear and flaps. Bullets may penetrate the engine, resulting in oil leakage. Your engine may just completely give up.

(continued on page 30)

CARRIER COMMAND

by L. S. Lichtmann

The pitch of the engines faltered as the great vessel began to decelerate. Looking up from his data terminal, the Exec spoke for the first time in many hours. "Approaching Point Bravo, sir. Lookout turrets report no enemy activity over the island."

"Status?"

"Strike on the deck, sir, and the amphibious assault force is in the docking bay and ready to roll."

The Admiral looked out over the objective a moment, and then gave the words. "Launch strike!"

Those of you who have dreamt of commanding an aircraft carrier task force may now have the opportunity for vicarious fulfillment, courtesy of Carrier Command from the U.K.'s Realtime Games Software Limited. Carrier Command is distributed in the U.S. by Rainbird Software, a company responsible for several well-known Amiga games including The Pawn, Guild of Thieves, and Starglider. List price for the realization of your fantasies is $49.95.

The Carrier Command Package

The attractive Carrier Command box contains a single 3.5" disk, a fat manual, a card of Amiga-version specific instructions, a "Carrier Command from Rainbird" sign on self-adhesive paper, and a Carrier Command theme song cassette tape. I shall leave the sign and the tape to more qualified reviewers, and instead concentrate on the game and its associated documentation.

The distribution disk is a self-booting, non-AmigaDOS disk. Since the Amiga will not recognize this as a valid disk, Carrier Command cannot be played from the CLI or the Workbench; you must reboot to start the game. The disk is not copy-protected as such, although its non-AmigaDOS layout causes DiskCopy to reject it. Instead, the disk comes with its own self-copying routine, which can be started by holding down the mouse button during the game's boot sequence. The copies themselves will produce their own working copies, so you don't have to worry about trashing your master disk. The game does have a protection scheme, of the "enter a word from the manual" variety. Some people find this arrangement annoying, but I find it quite acceptable for games, and certainly preferable to any form of disk-based copy protection.

The Game

Carrier Command is another attempt at the perfect melding of strategy and arcade action. The object of the game is to capture territory — in this case, an archipelago of imaginary islands — and destroy enemy forces under the control of a hostile robotic intelligence. The fictional background for the game is detailed in a "Mission Briefing" section of the manual. While the story line is not extraordinary, this does not detract from the enjoyment of the game.

To accomplish your task, you are equipped with a powerful, futuristic aircraft carrier that is outfitted with an impressive array of defensive and offensive gadgetry, including aircraft and amphibious tanks. In order to capture an island, you must build a command center

(continued)

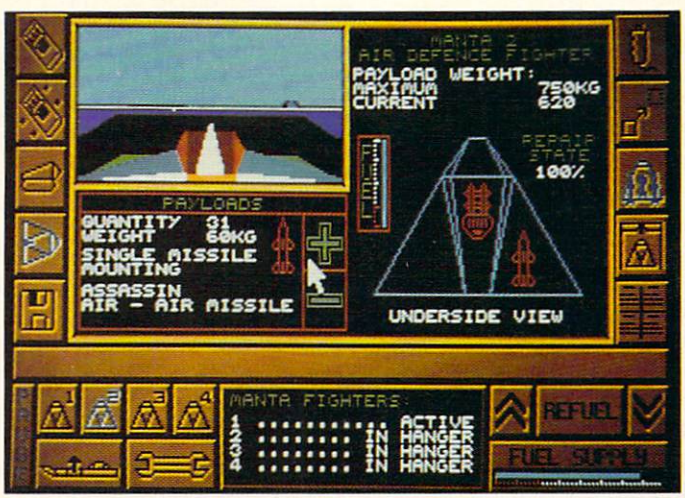


***Figure One**: The aircraft arming screen. Readying a ground-attack Manta, with a wingman already on the flight deck.*



***Figure Two**: An aircraft control screen. Maneuvering for an attack pass over an enemy island, with the aircraft carrier in view to starboard.*

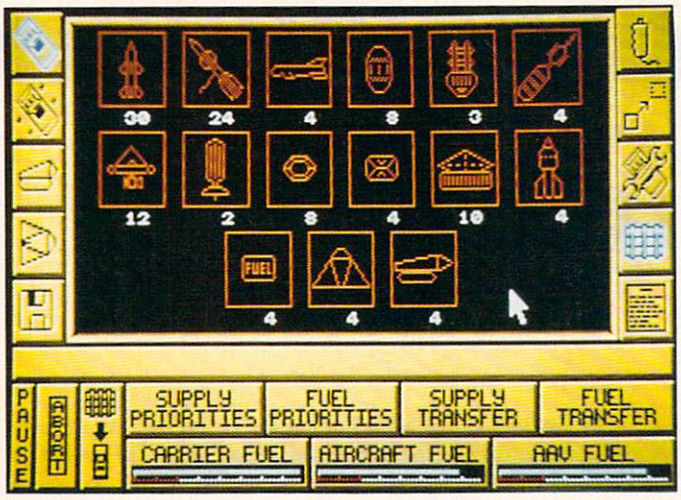


Figure 3: *The carrier stores and production control screen.*

on the island. This is done by either planting an "Automatic Command Center Builder" (ACCB) or, after beating down the opposing forces with your own airplanes and tanks, firing a tank-mounted Virus Bomb at the enemy's command center and subverting it to your own purposes. The processes of planting ACCBs, and dueling with enemy defense installations and aircraft, provide the arcade elements of Carrier Command.

Gameplay in Carrier Command is based around a series of gadget-controlled screens. The screen layout can be seen in Figure 1. The main selection gadgets are listed in a strip down the upper left side of the screen, and labelled with icons identifying the major control functions of the game. From top to bottom, they are: Carrier Control, Carrier Defense, Amphibious Assault Vehicle ("Walrus") Control, Aircraft ("Manta") Control, and Disk Functions.

For each of the main control functions, a separate set of specific control functions is accessible through the gadgets along the upper right side of the screen. For instance, in Figure 1 the Aircraft Control functions have been selected (note that the fourth icon on the left side of the screen is highlighted). The sub-options available from Aircraft Control are, from top to bottom: Direct Control (flight control), Navigation, Aircraft Fitting, Traffic Control, and Aircraft Information. In Figure 1, the Aircraft Fitting screen has been chosen (the third icon on the right is highlighted).

The top center of the screen is reserved for a large window which displays, for the particular control functions selected, a corresponding image. For instance, for Aircraft or Amphibious Tank Direct Control, the window shows the pilot's/driver's view (Figure 2), in very nice, filled, wire-frame solid graphics. For the Aircraft Fitting functions in Figure 1, you are presented with the current status of the aircraft you are working on, the available arms, and a subwindow giving the current view from the carrier's flight deck.

The lower third of the screen contains a strip for messages, status displays, and gadgets to control the various functions accessible from this screen. Control in Carrier Command is entirely gadget- and mouse-based, with the mouse and joystick being simultaneously usable for vehicle control.

The strategic aspect of the game centers around the necessity to build up a supply network, rather than merely capturing islands. As you take over territories and engage in combat, you will use up expendables such as fuel, missiles and (if you're not careful) amphibious tanks. The only way to replace this material is to convert captured islands into production centers for raw materials ("Resource Islands"), or manufactured items ("Factory Islands"). You may also create a "Defense Island" to assist you in protecting your supply network.

The supply islands must be connected by a network of routes in order to pass raw materials to factories, and finished items along to a designated "Stockpile Island", where your operational unit, the aircraft carrier, can be resupplied. The distribution of the islands permits paths only between certain islands, so a major element of the game is deciding where to place the various types of islands.

The other aspect of the game that requires intelligent planning is the management of your production. The proportion of types of islands becomes as vital as the placement of different types. Construct too many defense islands, and your assault forces will end up starved for supplies, and unable to capture enemy territory. The wrong proportion of resource islands to factory islands will leave your forces operating at less than optimum efficiency, with raw materials left accumulating uselessly, or factories sitting idle for lack of raw materials.

Furthermore, you must make choices concerning the types of supplies produced. There are fifteen different items which can be produced (see Figure 3), as well as three different types of fuel. You must assign production priorities for all items and fuels, as well as stockpiling limits. Choose wrong and your carrier will be stranded in mid-ocean for lack of fuel, or cruise around futilely for lack of equipment to mount assaults!

A game of Carrier Command will probably be too long for one sitting. A "save game" feature has been provided for this reason. Up to four games can be saved to numbered areas on an unformatted disk. You can load a saved game without overwriting the information on disk, so (unlike real life) you can keep playing a particular situation until you get it right. (In the early copies of Carrier Command, there was a bug which prevented saved games from being loaded again to continue play, but this has been corrected in the copies now shipping.)

Impressions and Judgments

Be prepared for frustration.

Those arcade sequences are HARD. I have not yet been able to take an enemy "Defense Island" successfully, which consequently brings my strategic plans to a grinding halt. One of the biggest problems is, while the player can program vehicles to go automatically to preselected locations, with one operator, only one aircraft or tank can be fully controlled at a time. The enemy seems to be able to coordinate any number of aircraft and missile launchers at a time. Those aircraft and missiles are also

(continued)



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Steve King, Commodore Magazine
April 1988

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Oran J. Sands III, Info Magazine
June 1988

Envision a creative freedom you've only dreamed about. Imagine page flipping, color cycling, text generation, and ANIM animation, all combined at the same time on the screen. Now, from the simplest slideshow to the most sophisticated desktop video production, that dream comes true with The Director.

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supply. However, I think I'm making a little progress by changing the tactics of my assaults. (Excruciating difficulty is a common feature of all the British arcade games for the Amiga that I've tried. I never made any headway with Starglider. Do the British have preternaturally good reflexes, or am I just unusually ungifted?)

The difficulty of the arcade sequences guarantees that the game will not quickly go stale, but it can be a real problem for new users and pinball wimps like myself trying to sustain interest. Adjustable difficulty levels would have been a welcomed addition. Another would have been a few hints on tactics, and better indications of enemy capabilities.

One good feature is that Carrier Command provides an "action game" option, which bypasses the strategic portions of the game and sends you directly to a well defended enemy island to attack. This gives you a chance to learn the vehicle fitting and control functions, and to practice using your assault equipment in combat.

Be prepared to exercise a little patience, too. Carrier Command is a very complex game. It will take you a while to learn all the features and their functions. (I'm still learning.) The manual is good, although finding information is not without difficulty. A good index would help immensely.

The overall production values of Carrier Command are very high. The screen designs are very attractive, and quite clean considering their complexity and the number of control functions involved. The use of "gimmickry" is intelligent, too. The vehicle arming screens (such as in Figure 1) require you to drag an icon of the appropriate weapon from stores and place it on the desired hardpoint. This is simpler and quicker than adding further gadgets or pop-up requesters. It also adds a pleasing layer of "chrome" to the game. Sounds have been added in the expected places: carrier engine noise, weapon firing, etc. The sound is generally of good, but not outstanding, quality and interest.

One of the most captivating features of the game is the overall consistency of the game world. If you have an aircraft circling the carrier on automatic, you will then be able to see it flying around if you swim up to the an island where you have set up a factory command center, and you will find installations and buildings in various stages of construction. Fly low over a moving tank, and you will hear its engine noises superimposed over your own. Fantastic! Such attention to detail adds immeasurably to the game's ability to sustain interest, not to mention its sense of realism.

The arcade sequences are of high quality. The 3D graphics are excellent, although somewhat spare when compared to, for example, Arctic Fox. The consistency of the game world and the liberal use of radar stations, factory buildings, etc. on the islands helps alleviate this. The animation is superb, displaying the most rapid updates and smoothest scrolling of any solid-graphics game I have ever encountered.

"Overall, I would rate Carrier Command as one of the best games ever designed for the Amiga."

On the whole, I prefer the use of gadgets to keyboard commands. However, vehicle control requires one to be clicking continually on the mouse to toggle between selecting gadgets and steering/firing weapons. I've been zapped many times while attempting to change weapons and escape enemy fire at the same time. Providing a set of key presses to duplicate vehicle control functions would have been highly desirable.

I have a few other grumbles concerning the game, all of which might be dismissed with the traditional, "That's not a bug — it's a feature!" (Sometimes wargame rules that seem exceptionally stupid at first glance are necessary to produce a challenging game with good "playability".) Nevertheless, here goes.

The carrier itself seems to have an unrealistically small fuel supply, giving a very limited tactical range. The compensation for this is the ease with which the stockpile island can be moved unrealistic than necessary. Why not make the stockpile island harder to move, and the carrier easier to operate independently?

Also, your adversary seems to move unreasonably fast. Even given the fact that the enemy starts out with a small supply network already in place and, being a computer, it doesn't have to spend as much time as you do dithering about what to do next, the network of hostile islands seems to expand faster than logically possible, considering the enemy's forces are supposed to have the same capabilities as yours.

Another facet of the game I find irritating is what appears to be the improper or unoptimized use of real time. This seems to be a common problem in games which have some real-time aspects. For instance, one should be able to examine the strategic map or the supply priorities in very little game time, in terms of movement or the enemy's progress. Instead, events click right along while you're pondering your next move. Conversely, some sort of real-time rate control, such as that found in Microprose's Silent Service, would enhance game play by letting you eliminate the substantial waits while your vessel moves to someplace interesting.

However, these are comparatively minor quibbles. Overall, I would rate Carrier Command as one of the best games ever designed for the Amiga. The blending of strategic and arcade elements is by far the best of any Amiga game I have seen. The 3D graphics are first rate, and the game world consistency sets a new standard.

I would enthusiastically recommend Carrier Command to anyone looking for an arcade challenge more intellectually demanding than the 37th level of Pac-Man, and emotionally equipped to bear the frustration of trying to take those cursed Defense Islands!

Carrier Command ~~$44.95~~

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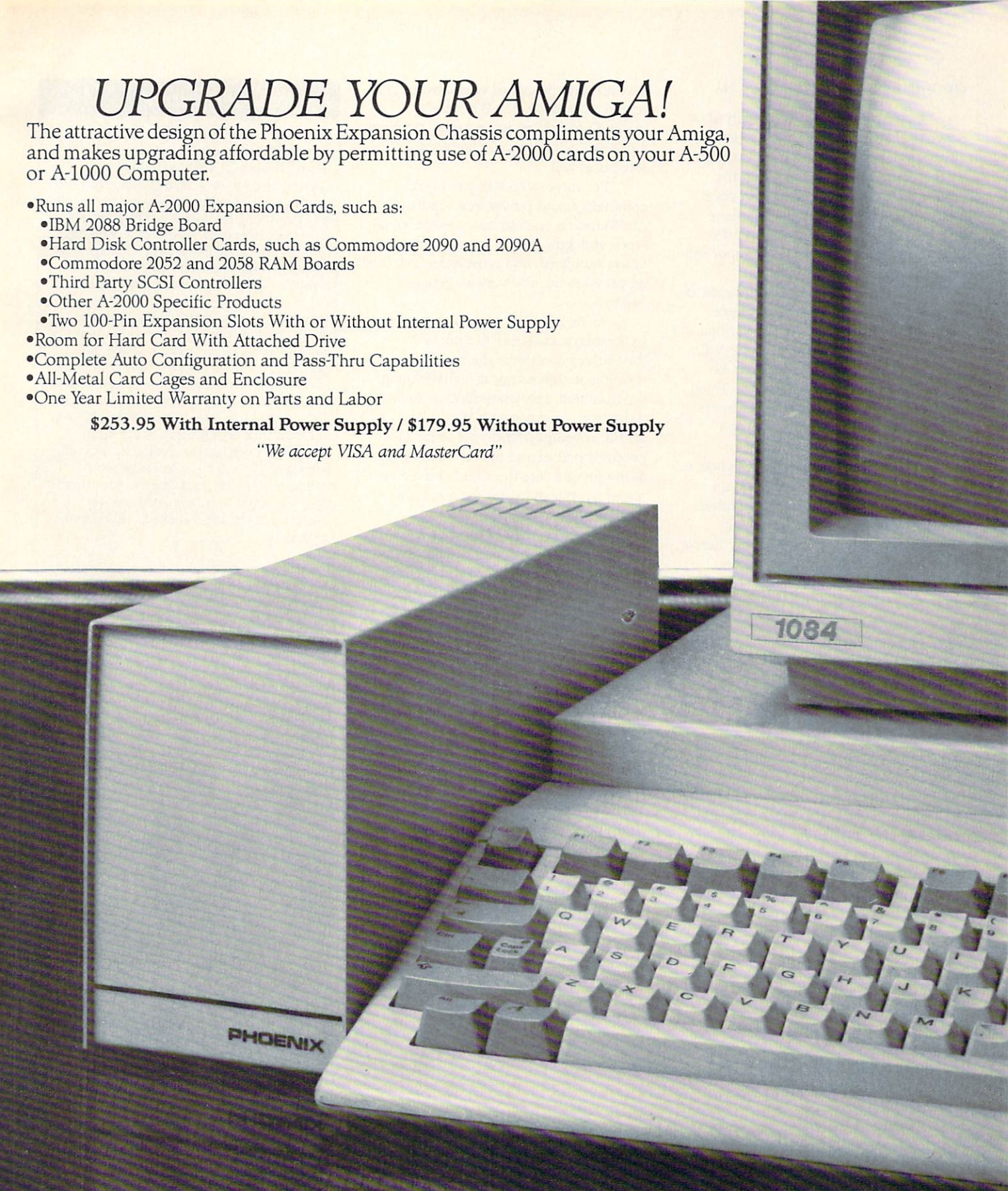
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*(**Air Warrior**, continued from page 24)*

As long as you aren't actually shot down and killed in the air, there is always a possibility you can manage to fly the plane home, or ditch it in the countryside. This all depends on your skill as a pilot, your faith in the plane, and the chance that your enemy has already crashed, turned for home, or run out of ammo.

Due the great number of planes to choose from, as well as the different attitudes and skill levels of the various pilots, Air Warrior rarely becomes dull. Each objective and encounter can be realistically calculated for success if you are familiar with the pilots, squads, and planes. Timing and luck also play a major role.

It would be suicide, for instance, to make a low altitude approach on an enemy ace in most situations. In other cases, diving from a relatively high altitude into a squadron of enemy Zero's with your P51D Mustang, and then pulling away unscathed might scatter them enough so you can pick off one or two individually. Sometimes, after a bit of dogfighting and maneuvering, you finally plant yourself on the tail of your enemy, only to find that you haven't been keeping an eye on the skies around you and one of his teammates is on your tail pumping bullets into your fuselage. You wouldn't normally attempt to take on a lone A-26 Invader (Bomber) if you were flying a Spitfire, unless you knew it had unmanned turrets. But you would certainly give it a run for its money, manned or not, if your were flying a Focke-Wulf. Some pilots always fly in squadrons, some always fly alone and at high-altitudes, and some can always be found as part of a two-pilot or three-pilot team.

The point is that the simulation is by its very nature a tactical, but unpredictable game. Anything can happen and usually does, but knowing the odds is better than leaping headstrong into the unknown.

Final Approach

A major concern among Amiga owners is the ability of software to multitask well with other programs. In this respect, Air Warrior fares pretty well. Most files you might normally multitask with will also run along with Air Warrior. It is only while you are in flight that you may run into problems when swapping screens (L-AMIGA/M). But simply landing your plane and entering terminal mode will allow you to change tasks/screens at will.

For those who enjoy realism, complexity, and power in a simulation, Air Warrior is hard to beat. People of all types and ages can be found every night in the simulator, and most agree that it is an exceptional, and very addicting, product.

Aside from the resources provided by Kesmai and GEnie, the pilots themselves contribute the most to creating an interesting and challenging environment. Many are pilots in the real world too, or experts on World Wars I and II, constantly lending a sense of professionalism and history to the game. Many people take the simulation semi-seriously, which makes for great fun whether or not you do.

A wide variety of topics are discussed in the conference rooms, and even more are debated in the special message bases set up for Air Warrior in the Games Roundtable area of GEnie. From these discussions and debates are spawned not only deep-rooted friendships and rivalries, but also ideas for changes in the current host and micro software. (As of this writing, much of the talk is about new planes for WWII, balloons/dirigibles for WWI, and the new terrain now under development.) The Kesmai team constantly involves themselves in the message and conference areas, answering questions, providing data, and soliciting ideas. In this way, Air Warrior is perpetually evolving.

If you are into battlegames or flight simulators Air Warrior is one in which you will instantly become enamored, and no doubt eventually hooked on. So, slip into your flight jacket, pull down your canopy, and take a giant step back in history.

To acquire an account on GEnie or if you have further questions, simply call GEnie Client Services toll-free at 1-800-638-9636.

•AC•

Air Warrior Update

As we mentioned in the original article, Kesmai has been hard at work making changes to both the host and micro software. In addition to the general bug-squashing, new features have been added and old features have been upgraded. As of this writing this new version is still in the beta-test stage, but should be available when this issue of Amazing Computing hits the newsstands.

By far, the most notable change is in the terrain itself. Not only has the AirWarrior world become larger, but it is also more populated. Cities and towns have sprung up in numerous locations, additional secondary airstrips have been installed, and the single anti-aircraft guns have been replaced by twin ack-acks (one on each side of the main airstrips). Low hills now dot the countryside and some of the beta-testers have given names to a few of the dominant mountains. Because of the world's inflated size, the number of available theatres has also been increased.

No "real" world would be complete without bodies of water, and Air Warrior is no exception. The addition of an ocean to the terrain lends a sense of credibility to the idea of a three-country electronic world, and its presence will greatly change the tactical outlook of the simulation. And what's an ocean without bridges? The bridges can be landed on, flown over bombed for points, and used as stepping stones for jeeps making their way from peninsula to peninsula. And what about ships or boats? Well, at the present time aircraft carriers have been stationed in strategic spots; non-moving, non-controllablle by the players. You can land on or take off from the carriers, and use them as bombing targets for points. Rumor has it that future enhancements will allow players to control the carriers, or board some smaller craft (like a PT Boat) to patrol territorial waterways. And of course, no ocean is complete without an island or two (or three), bays, canals, sounds, and seas.

There are a number of other changes in this new version of Air Warrior, and probably alot more will be implemented before it is made public. A superb simulator which just keeps on getting better.

—Michael Mantino

New Products

& other neat stuff

by Michael Creeden

Thinker

Programmers and database users, do you feel limited by software that doesn't move as freely and creatively as you do? Writers, do you find traditional outliners a bit too rigid? You think creatively—albeit a bit chaotically sometimes—and you want a program that will sort of bend with you. Well, *Poor Person Software* may have just what the doctor ordered.

Thinker is an integrated package combining Hypertext, Hierarchical-text, word processing, picture display, and Hypermedia. The program runs on Workbench 1.2 or 1.3, and uses Workbench windows to make it compatible with multi-programming.

The Hypertext feature actively links text, allowing readers to jump from one section of a document to another at the click of a mouse. It also features inter-document linking, launching Workbench applications, and picture display.

Hierarchical-text is based on the idea of an outline processor. Thinker doesn't distinguish between headlines and text body - any statement in the hierarchy can be a sentence or a paragraph. Thinker offers all the facilities for viewing and manipulating outlines, and provides Hypertext links and labels to give you more power than traditional outline processors.

Database users, if you want a flexible way to organize data, Thinker is for you. When used as a database, Thinker will give you free-form, multiple-linked records. As a writing tool, Thinker allows unlimited cross-referencing and reorganization. As an aid in program design, Thinker helps control program structure, and integrates programs and their documentation.

If you want a program that allows for creativity that goes beyond figuring out the manual, think about this one.

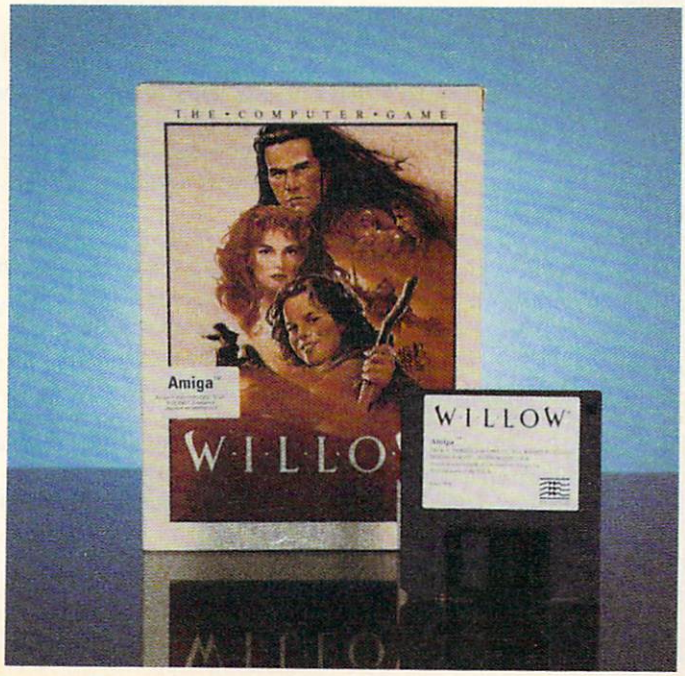
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The Scanlock uses analog and digital techniques to allow Amiga users to create home studio production from live or taped film footage, along with the Amiga's own dazzling computer graphics. The reference video can come from a stable source, such as a video camera, or from playback of a VCR tape. Scanlock processes both composite formats (NTSC or PAL) or component formats (luma/chroma or Y/C), including S-VHS, M2, or BETACAM.

(continued)





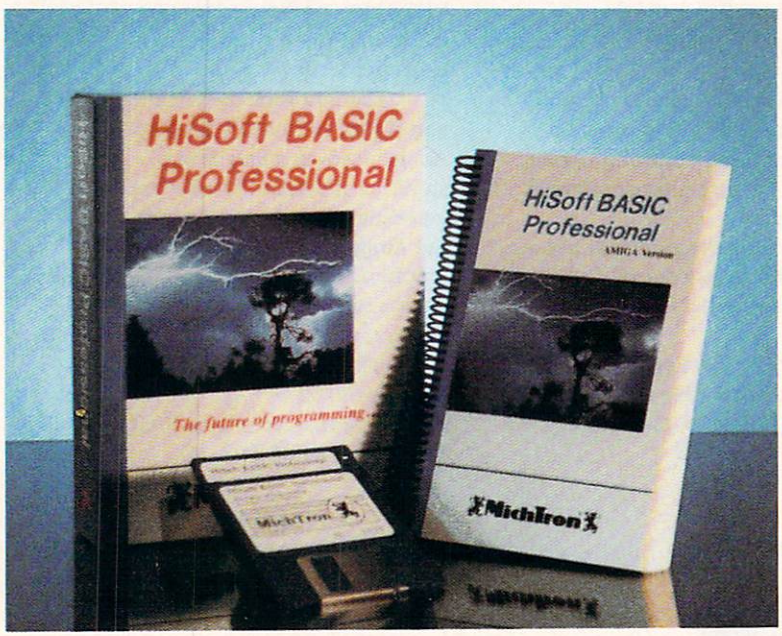
The Scanlock VSL-1 is available in two models, the Model VSL-1-N or the Model VSL-1-P. The N model is compatible with the NTSC format, while the P model complies with PAL broadcast specs.

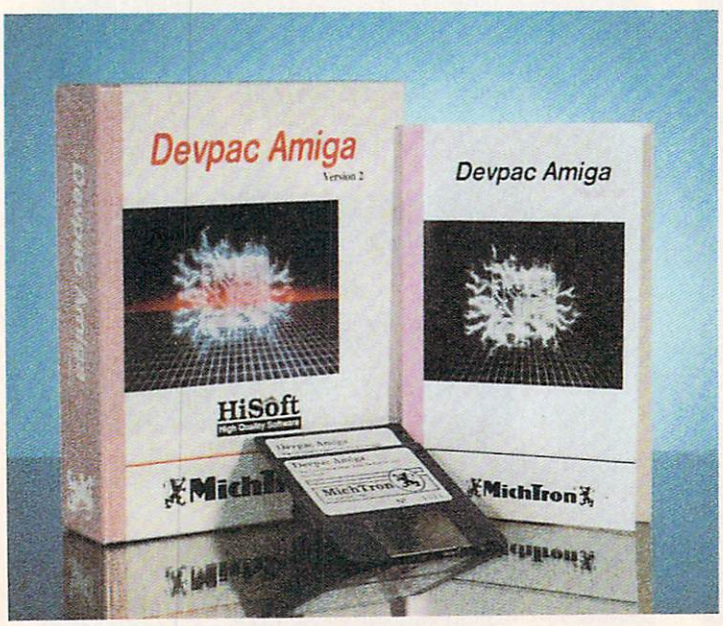
Using the Amiga's external clock and H/V reset inputs, the Scanlock will genlock your Amiga to a reference video signal. When you create your Amiga graphics (in either interlace or non-interlace mode), the Scanlock output will be identical to that of the reference video as the Scanlock reformats the computer's output to match the timing of the reference video.

The Scanlock also includes a video-process amplifier for the composite video signal. The Scanlock lets you calibrate the parameters within wide limits. A vertical interval switch is included for glitch-free switching between the reference and computer video. The package also includes a remote control, as well as an external connector that allows you to operate the switch by another computer, or by an editing controller. Scanlock also provides independent FADE controls for reference and computer video from full in to full out.

All units include a connection for an optional external power supply, or a cable connected to the Amiga's internal power supply. The Scanlock comes with two 4 pin miniDIN connectors to connect the Scanlock's S-VHS output to an S-VHS recorder, a cable with a 4 pin miniDIN connector, and two RCA jacks to connect any Amiga monitor to the Scanlock SS-VHS output. It also contains a rack mount kit, user's manual, and demo diskette.

VidTech International, Inc.
2822 NW 79th Avenue, Miami FL
331222
(305) 477-2228; FAX (305) 591-1651





A Faster BASIC

Programming in BASIC has its good points and its bad points. For good points, BASIC's high-level, English-like syntax allows novice programmers to start programming sooner than they could with lower-level languages. And the fact that BASIC is interpreted, allowing users to edit as they program without having to worry about constantly recompiling, helps new programmers maintain a measure of sanity.

But convenience comes at a price—a price usually paid in speed. Programming in BASIC is usually S-L-O-W unless, of course, you use a compiler. Compilers let you convert your BASIC programs into machine code so you can have a little of both worlds: a high-level, English-like language combined with more speed than you'd get with interpreted BASIC. *MichTron's* **HiSoft BASIC Professional** gives you these plus many more features that will help make BASIC programming easier and quicker than you ever thought possible.

HiSoft BASIC Professional features an interactive edit/compile/run cycle that gives you interpreted programming ease along with a bit of compiled programming's speed. It offers full Menu support, and extensive graphics, window, and screen commands. You can also access Amiga libraries as if they were built-in statements for complete machine access. HiSoft BASIC includes event trapping and sprite routines using the OBJECT keywords.

Compiled programs execute either in their own window or, to minimize size, in the CLI window. HiSoft includes a compiler without an editor for disk-to-disk compilation. There are no size limits on strings or arrays—HiSoft allows string variables up to 16 megabytes long, and array sizes are limited only to memory.

Compiled programs have no run-time overhead, as all compiled programs share an Amiga library. HiSoft also compiles AmigaBASIC™ with no changes, Microsoft

QuickBASIC™ with little change, and most other BASIC environments with little or no modification. If you want to program in BASIC, and not grow old in the process, check out HiSoft BASIC.

MichTron
576 S. Telegraph
Pontiac, MI
48053

A New CLAS

If you just can't find the educational software you need, you can always create your own. But that usually means learning to program, not something a whole lot of us have the time or patience to do. But now, thanks to *MicroEd,* you don't have to learn to program. Just take a CLAS— a Computerized Lesson Authoring System, that is.

CLAS is an updated version of the MicroEd authoring program that lets you write your own interactive educational software simply by telling the Amiga what you want. CLAS uses a series of commands that interpret your instructions into Amiga-ese so you can tell the Amiga the type of program that you want.

You can add voice and music to your lessons, use digitized picture screens, and custom design every program to meet your specific needs. And CLAS speaks more than one language. You can write lessons in French, English, German, and Spanish.

The program comes on two disks - an Author Disk and a Student Disk. You create your lessons on the Author Disk, which also contains a tutorial that teaches you how to use the program. Once you've created your lesson, save it to the Student Disk, which will hold several interactive lesson programs at one time.

If you're tired of educational software that just doesn't meet your needs, show some CLAS and do it yourself.

CLAS ***$99.95***

MicroEd Inc.
P.O. Box 24750
Edina, MN
55424

Programmer's Toolbox

MichTron has released version 2 of the popular **Devpac Amiga**, the assembly language development tool for the Amiga. The program is a toolkit for assembly language programmers. It includes a full macro assembler, full screen editor, disassembler, debugger, and fast linker all in one package.

Version 2 boasts many new features, including an assembly speed of 70,000 lines per minute, or about 35,000 lines per minute for large, symbol-packed files. The program integrates the assembler, debugger, and editor for faster interactive program development. The editor has been speeded up as well, and offers full featured file selector, block marking, and easy configuration.

New assembler features also included are local labels, multiple sections, up to 127-character-long labels, complete Metacomco assembler compatibility, and greater listing control. The debugger allows multiple windows, conditional breakpoints, complete expression evaluation, disassembly to disk, and more.

The package includes a 200-page manual with program details, operating system guidelines, 68000 Opcode guide, and a brief assembly language tutorial.

Devpac Amiga ***$99.95***

MichTron
576 S. Telegraph
Pontiac MI
48053

From silver screen to Amiga screen...

The latest entry in the movie screen to Amiga screen sweepstakes is **Willow**. The George Lucas fantasy adventure is now a *Mindscape* graphics adventure. In case you missed the movie, the story involves Willow Ulfgood—maybe that's supposed to be some kind of pun on "elf good", because Willow is a little fella—and his quest to defeat the evil Queen Bavmorda, and save Elora Danan. The story is told—or rather scrolled—on the opening screen of the game. After telling the story, the scroll will start over, and tell the story again.

This scroll is also the door into the world of Willow. If you select one of the highlighted words in the text, you will be drawn into the story. And that, as they say, is where the action begins.

Selecting different words on the scroll brings you into different areas of the game. Each game section is like a separate game in itself. You can check each level except the last in Practice mode. Practice mode is kind of a dry run - you can check out the dangers ahead before bursting right into the action.

If you're a hardy soul, jump right in. Click on the word "Willow" in the opening scroll and you're in quest mode. Quest mode is a "take" - it launches you onto the first of the game's seven separate adventures. Each level is a distinct adventure, not just a different level. On your quest, you'll travel through dungeons, woods, a battle with a sorceress, caves of ice, a sword battle, and the final battle: you against Queen Bavorda in a battle of magic.

To save Elora, you'll have to get through all seven adventures, and you get eight chances to fail. (Pretty positive, eh?)

...and from coin-op to Amiga screen

Hot cars, hot music, and sensational scenery. Another Frankie and Annette romp? Nope, it's another arcade to Amiga port: *Sega's* **Out Run**. The Amiga version has all the features that made Out Run such a popular coin-op: breakneck, tire-screeching speed, mid-air wipeouts, hot graphics, and, of course, the beaches.

But there's more to the scenery than beaches. Out Run's five courses will take you past the German Autobahn, the Swiss Alps, and California's Death Valley, as well as the beaches of France. At the end of each course, you'll see a map showing you how far you've gone.

So hop in and get ready to drive. But first make sure you choose your background music: passing breeze, splash wave, magical sound shower, or silence. Then pull up to the starting line, and get ready to roll. You'll squeal through cities and power up mountains as you drive your life away—maybe literally.

Out Run ***$49.95***
Willow ***$39.95***

Mindscape
P.O.Box 1167
Northbrook, Illinois
60065-1167

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(*Falcon*, *continued from page 16*)

and control of the Falcon. Practically every key (including keypad, help and cursor keys) has some function. Because of such complexities, I cannot stress enough the importance of reading the manual. You will not be able to fully appreciate or operate Falcon unless you familiarize yourself with the booklet.

Finally it's time to fly. Remember, this program is a serious attempt to faithfully simulate the F-16. Even the seemingly simple task of engine startup takes special action. Pressing the "+" key starts the engine rotating (digitized sound to match). Pressing "+" again lights up the turbine, and off she goes. A flaw in Falcon is realized at this point. Knowing the percentage of power you've applied is highly stressed in the documentation. Unfortunately, the engine RPM gauge has no units of measure indicated. No RPMs, no percentage, just graduation marks. At higher levels, improper use of the throttle will destroy the airplane.

With this in mind, start your aircraft and rev up the engine. Now hit "W" to release the wheel brakes. After a short run, pull back on the stick, and you're up. If you wait a few moments, "Bitch'n Betty's" digitized voice starts yelling a warning. In this case, you have exceeded 300 knots with the gear still down. At Lieutenant rank, just retract them. At higher levels, you will have probably damaged your aircraft beyond recovery. Other digitized verbal warnings are heard when the wheel brakes are left on, when you've splashed a Mig, or when the tower tries to direct you home.

All is not Utopia

Now that we are airborne, you will quickly be confronted with Falcon's biggest drawback. At the Lieutenant level, the fighter does not fly realistically. At other levels, it is difficult to fly. The problem appears to be at least twofold.

First, there is a basic limitation in Falcon's control programming. Spectrum HoloByte admits the mouse controls are not working properly and, even with the keyboard, the tendency is to overcontrol. The programmers tell me they insisted Amiga Falcon duplicate the F-16's flight characteristics as close as possible. The real F-16 has a roll rate of 220 degrees per second. Amiga Falcon rolls at 220 degrees in 1.5 seconds. They claim this high roll rate promotes overcontrolling. I disagree. After all, there are two ways to control its sensitivity. The problem is that roll and pitch actually seem to be non-linear, meaning you cannot input simultaneous roll and pitch commands. If you want a climbing left turn you must first roll left the amount you want, then pull back on the stick. This inability to respond to diagonal control input is verified by the HUD control stick position cursor. No matter how you put the stick or mouse into the corners, the control cursor first moves to the side and then down, eventually stopping in the area where your controller is positioned.

Second, we have been spoiled by F-18. One of the best things Interceptor does is fly well. What I found though, is that after a while, you begin to compensate and Falcon seems to handle better. Also, as you progress to higher levels, Falcon begins to fly as you'd expect. The only problem is the Migs and SAMs get more agile and accurate, too. Spectrum HoloByte promises a fix is on the way. They have recruited people familiar with Air Warrior and other flight simulators to help develop and test the improvements.

How about Targets? Would enemy aircraft, airfields, SAM sites with rotating missiles, buildings, houses, shacks, water towers, bridges, and a moving convoy of trucks satisfy you?

Now that we are up and steady, let's do a mission together. The first and easiest mission is appropriately entitled Milk Run. The object of Milk Run is to attack three tall buildings on the practice range. We will use the AMG 65 air-to-ground Maverick TV guided missile.

First, select the AMG 65 missile and its HUD (there are four different HUD displays). Next, change the radar display to a detailed map which shows the location of targets, SAM sights, mountains, airfields, and other landmarks. Upon visual contact with the target, reselect the radar display (now actually a TV picture of the Maverick's view). There is a slight magnification of the target, but not enough to be of any added assistance in locking in on the target.

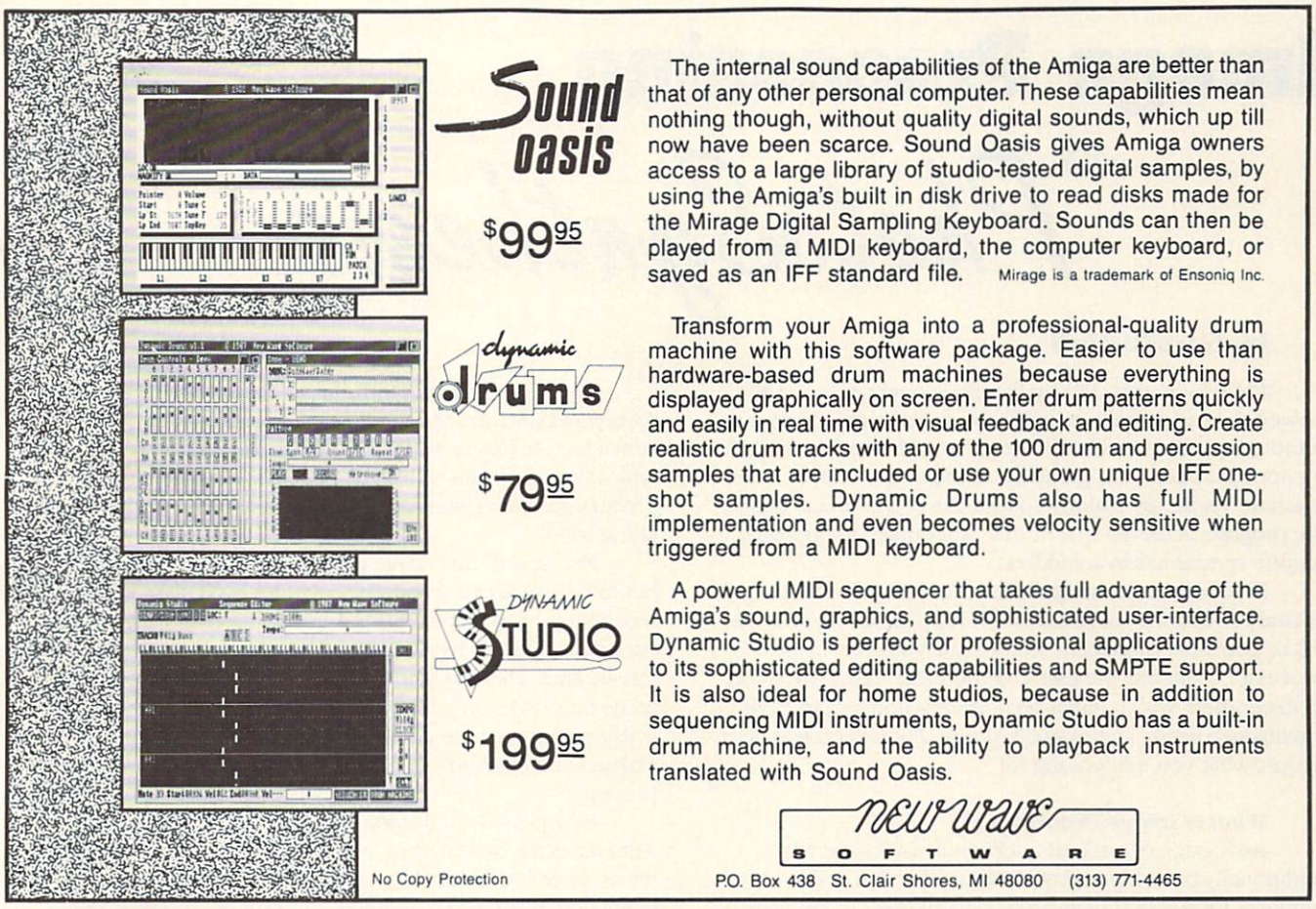
Now, bearing in on the target, maneuver so as to place the crosshair center on the target. When this happens, squeeze the trigger once. This designates, or "pickles", the target by placing a square around it. This locks the missile onto the spot you've selected even if you change the flight path or altitude of your aircraft.

If you have misaligned the target, hit the "X" key and try again. When you obtain an acceptable alignment, watch the HUD. When "LOCK" changes to "in range", squeeze the trigger again and you will hear and see the missile bearing down on the target. If you make a hit, the target explodes and, after the dust and flames clear, you'll see a shell of the structure. If you miss, a black spot appears at the point of impact. These black marks are made by all the ordnance. When you strafe targets, the bullets will leave their telltale marks, too. Nice!

If you blow away the three buildings, you'll find, just a little way to the west, a small group of houses and shacks. Let 'em have it! By the way, I have not yet been able to blow up the water tower. Maybe you can do better.

Time to return to base. Select the map and look for your present location. It will be represented by a black flashing cursor. It is possible to fly off the map, and there is only one map. But here is another interesting thing about Falcon. In all the other simulators, when you fly beyond the mapped world you will find only blank, featureless terrain. Not so with Falcon. This program apparently merrily continues to randomly generate scenery, targets, airfields, roads—the whole works. I actually headed Falcon west and walked away for ten minutes. When I looked back, Falcon was thundering over rivers, bridges, and farms. Nicely done! If by chance a Mig crosses your path, select the Sidewinders, get a lock, and watch him explode into a ball of smoke and flames as he spirals in.

When in the vicinity of our home airfield, prepare for a long final approach to runway 09. Note that only this runway is set up for ILS landings. Press F7 and the HUD changes to display an ILS glide



slope indicator. The Angle of Attack (AOA) display illuminates to indicate if your speed, glide slope, and rate of descent are correct. The HUD also displays the flight ladder. Ideally, we want the ILS grids centered, a green light on the AOA, a minus 2 on the flight ladder, and about 150 knots indicated airspeed. Good luck!

As I've said, Lieutenant is a piece of cake. Any other level is hard work. In regards to landing Falcon, the manual says that as you pass the threshold, at about one hundred feet, you pitch the aircraft (control 2 or 8) 6 to 8 degrees, settle nose high (see figure four) and contact on the mains, cut the throttle, and once below 50 knots, hit the wheelbrakes. It is possible to land as described, but only after reading how to do it, and then practicing a good deal.

If you've landed successfully, press the escape key and Falcon's last two screens will appear. The first screen is Mission Results. Here you'll see snapshots describing the events leading up to completion of your mission, any decorations or medals awarded, Migs killed, targets hit, and the number of merits earned. Now click the mouse and you'll see Sierra Hotel, the High Score screen. Here the best of the best are scored. Click again and you return to the Duty Roster, and the mission begins once more.

Other Features

Falcon is packed with many other features and options. It is possible to hook up to another Amiga by cable, or to an Atari ST or Macintosh via modem. Note that the Amiga and Atari computers must have at least one megabyte of RAM. Unfortunately, when using modems, even at 2400 baud, the action slows down. Another unique feature is the "Black Box" for recording your plane's flight path and that of any Migs in the area. The Black Box can replay a dogfight, graphically showing the flight paths, airspeeds, and altitudes flown. Training scenarios are available to hone your fighter tactics.

As a closing testimony to the fidelity Falcon attempts to capture, Perceptronics uses the Falcon code as the foundation for its low-cost F-16 fighter trainer now available for sale to the military.

Summary

I like it. Is it the best? Almost. Falcon has something for everyone. When played at Lieutenant level, it's an arcade "shoot 'em up". When flown at Major or above, it is deadly serious. Maybe that's something Spectrum HoloByte can adjust. It should not be so difficult to successfully complete a mission (read land) until, perhaps, Lieutenant Colonel. Falcon does have flaws, but overall it is a great piece of software.

The Future

Spectrum HoloByte is hard at work improving Falcon. By April they plan to release a version that will fly better, support a 68010/20/30, be easily installed on a hard disk, and have a modem mode that works as advertised. A new scenery disk is planned, and next year might see an intelligent wingman to fly with you, and support for an analog joystick.

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Image Processing with PhotoSynthesis

by Gerald Hull

PhotoSynthesis (PS) by Escape Sequence, Inc. is a powerful, academically oriented image processing program. Although persons involved in graphics can use the program for special affects, it is primarily aimed at students of machine vision. By making special use of the Amiga blitter, the program achieves speeds that other microcomputers require special hardware to beat.

If your interests are primarily aesthetic, you will probably be more than satisfied with programs like Butcher 2.0 or Pixmate. They both feature functions for image processing, and are cheaper and friendlier. But if you want to experiment with a much broader repertoire of artificial intelligence image analysis techniques, PhotoSynthesis may be just what you are looking for.

What is Image Processing?

Advocates of artificial intelligence (AI) have not traditionally been blessed with circumspection and humility. One apocryphal story has a pioneer in the field assigning the problem of computerized vision for a graduate student to "solve" during summer recess. A quarter of a century later, a child of three can still perceive more in an instant, and more reliably, than a cluster of VAX's can over one weekend.

Nonetheless, great strides have been made in both the theory and practice of mathematical image analysis. Nowadays, machine vision in research and industry typically uses specially designed parallel computers, with processing speeds measured in "bips": billons of operations per second.

The goal of this image processing is not visual effect, but information extraction This includes such tasks as object recognition, flaw detection, and quality measurement. For example, you may want to analyze satellite photos for missile sites, check pill bottles for missing labels, or count white corpuscles in a blood sample. In each case, the idea is to operate on an image so that the desired information is isolated and extracted from whatever "background noise" is present.

In an actual application, this extraction process can sometimes be facilitated by specialized lighting and sensors, which in effect, are analog methods of information extraction. Still, such refinement can only go so far. At some point, you are going to end up with a digital representation of an image that requires some kind of computer processing to reveal its true import.

Broadly speaking, we can distinguish two approaches to machine vision. On the one hand is the AI oriented conceptual approach, whose ultimate aim is to emulate the human perceptual process. On the other is the pragmatic, task-driven approach of industrial and military applications. Though both

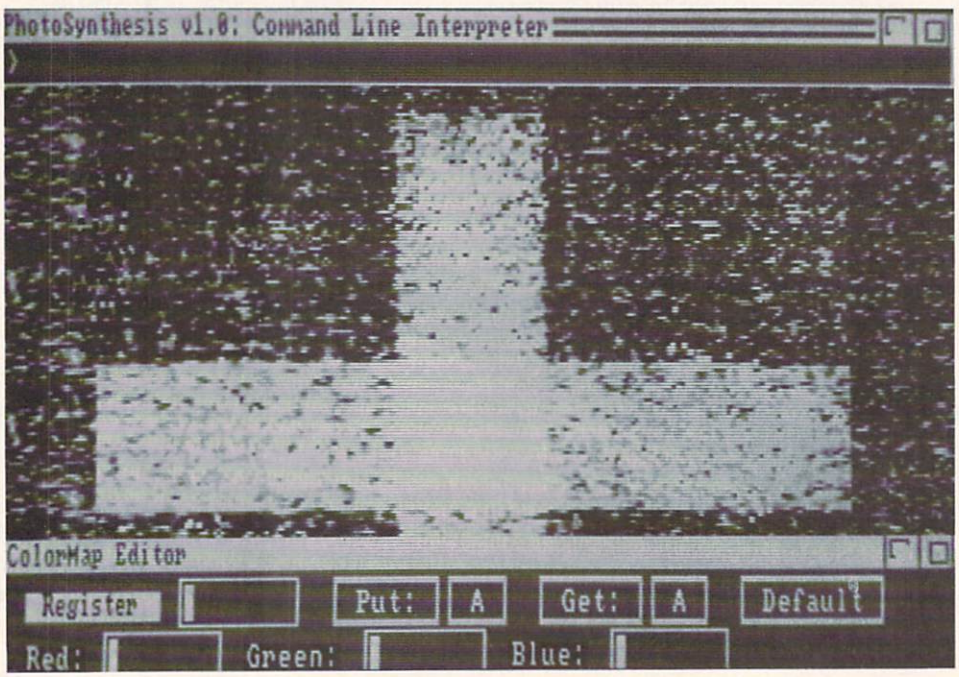


Figure One

PhotoSynthesis CLI with the Abingdon Cross benchmark image and the ColorMap Editor.

have their strengths, my personal view is that the model of human perception is as unhelpful in machine vision as the effort to mimic birds was in achieving heavier-than-air flight.

Regardless of orientation, however, there is general agreement on the breakdown of "image recognition" into four stages:

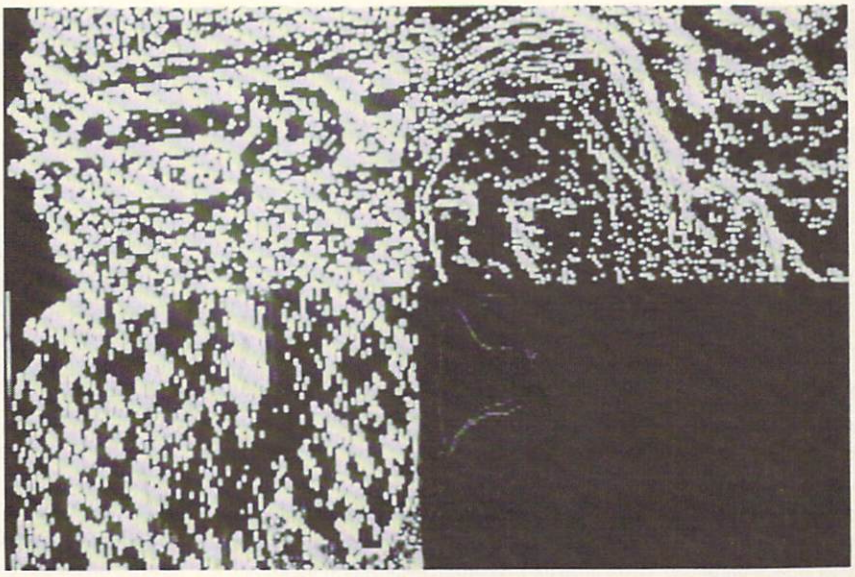


Figure Two

Four flavors of PhotoSynthesis edges. ***upper left****: binary Marr-Hildreth;* ***upper right****: gray shift and subtract;* ***lower left****: gray horizontal Sobel; and* ***lower right****: gray shrink and subtract.*

1. Image representation,
2. Image to image transformations,
3. Image to parameter transformations,
4. Parameter to decision transformations.

PhotoSynthesis concerns stage two. It doesn't help you acquire images, nor does it provide tools for extracting numeric or other parameters from the images it processes. But in the realm of image-to-image transformations there is little that cannot be done, in time, by this program.

Getting Started with PhotoSynthesis

Nothing dramatic happens when you run the program. It writes copyright information to the screen and a long narrow window titled "PhotoSynthesis v1.0: Command Line Interpreter" pops up at the top of the screen. Commands can be entered either through "scripts" entered in this window, or via the menu items that hang off it. One can also invoke script files, which we later shall see is very useful.

There are three different ways for getting pictures into the program. Standard Amiga IFF images are loaded with "Read IFF," and special PS format images with "Read." If you have an ASCII representation of an image, and it meets specific format restrictions, Escape Sequence provides a program called AscToBin to convert it into PS format. This brings to light one of the program's persistent irritants: an "academic" disdain for user convenience. It's hard to see why the AscToBin function has been left in a separate program. Better yet, there could be a single command, familiarly called "Load," which is smart enough to detect and accommodate whichever format an image has.

Because of limitations on the amount of CHIP memory, required by reliance on the blitter, PhotoSynthesis only works with low resolution, 300x200 pixel images. Instead of indexing into an arbitrary Color Table, however, PS takes individual pixels to represent "grayscale" values. Zero means black, the maximum (for example, 31 with 5 bitplanes) means white, and the intermediate values represent proportionate levels of gray.

Further, the program allows up to 16 bitplanes per image, and can accommodate signed as well as unsigned pixel values. Most digitizers and paint programs, of course, don't produce grayscale images, so PhotoSynthesis provides a function called FixBW for converting both color and monochrome pictures into an optimal gray level representation.

Figure Three

Photograph of a young boy with the bottom half demonstrating the effect of the ***Local Contrast Enhancement*** *script.*



(continued)

One limitation is that PhotoSynthesis has no capacity for handling color. If you don't want to lose the color content of your image, your only recourse is to use a program like Butcher 2.0 or Pixmate to extract the red, blue, and green into separate grayscale components. After processing with PhotoSynthesis, you would then go back to the auxiliary program to recreate the colored image from the RGB constituents.

An Awkward User Interface

Since PhotoSynthesis allows images with greater than 5 bitplanes, image display is not automatic as is customary with other graphics software. You have four (and only four) different buffers— A through D — for holding and processing images. You must select both buffer and bitplane range to Display on the screen.

Image display with PhotoSynthesis is further complicated by the fact that although the images are all lo-res, the program interface is in medium resolution. As a result, once you have Displayed an image, the PhotoSynthesis window is covered by a screen with an incompatible resolution: the menus are no longer accessible. In Picture One, the low-res image of the Abingdon Cross benchmark has been pulled down to show the PS "Command Line Interface."

To reach the menus (for example, to Hide the picture), the image will need to be pulled down even further. This greatly constricts the interactive convenience of PhotoSynthesis. First you perform an operation on an image in one of the buffers. Then you select to have it Displayed to see what changes have occurred. And finally, you have to pull down the image to get at the menus to Hide it for further processing. (You can't operate on a Displayed image.)

And because the Displayed image doesn't show what buffer it represents, it's quite easy to get lost in all these manipulations. Finally, the act of pulling down the image occasionally selects menu items accidentally, a further irritant. The software clearly was not designed with menus in mind. To its credit, the program does provide gadgets for adjusting the Color Table (see Picture One).

Ops: Boolean and Mathematical

Although this hardly exhausts the problems PhotoSynthesis has with user convenience, a look at its wide range of operations reveals some redeeming qualities. The image processing functions are grouped by the menus into four major categories: Boolean, Math, Neighborhood, and Relation, with a few odds and ends located elsewhere.

As the user will discover by experimentating or from the documentation, different functions can be applied to different kinds of images. Some work with grayscale images, some require two images with the same number of bitpalnes, and some only work on "binary" images: pictures with a single bitplane.

The Boolean functions of Or, Xor, and And require two source images with the same number of bitplanes, creating a destination image via the specified logical operation. The function Not, of course, only requires one source image, which it negates. An additional item named Mask allows you to copy a grayscale image from one buffer to another only for those pixels which are "on" in a third, binary image.

The Math functions are Add, Subtract, Multiply, Divide, AbsVal, Average, and Median. They all do exactly what you would expect. For example, suppose you Multiply buffer A times buffer B and put the result C; in PS script language

```
C multiply A B.
```

The value of each pixel in A is multiplied by the value of the corresponding pixel in B, and the result placed in the correlative buffer C pixel.

In effect, this constitutes parallel processing with 320*200 = 64000 separate registers. As previously noted, the arithmetic can be either signed or unsigned. PhotoSynthesis will automatically provide a destination buffer with enough bitplanes, up to 16, to hold the result.

More Ops: Neighborhoods

The Neighborhood operations may be even more powerful, however, in image processing terms. The idea here is that the value of a pixel becomes a function of the values of the surrounding pixels, in this case the 3x3 array of "nearest neighbors." The Math operations Average and Median rightfully belong to this category. Convolve, Expand, and Shrink are gray level operations, while Thicken, Thin, and Skeleton are binary only.

The Convolve operation replaces a pixel with a weighted sum of its neighbors, as determined by a user-specifiable 3x3 array. For example, in looking for edges it is often useful to Convolve an image using "Sobel gradients":

```
-1   0   1          1   2   1
-2   0   2          0   0   0
-1   0   1         -1  -2  -1
```

As you can see, the first accentuates horizontal differences, and the second vertical. Picture Two shows examples of Sobel and other edges.

Table One

OPERATION	ONE	FIVE
And	>1	>1
Add	1	2
Multiply	1	6
Convolve (Sobel)	7	14
Expand	5	20
Thin	>1	—
Skeleton	92	—
Less	1	2
Threshold	—	1
FixBW	—	19

By making use of the Amiga blitter, PhotoSynthesis is able to achieve considerable speed in its operations, especially in view of the fact that most require separate calculations for each of the 64000 pixels in a low resolution image. Here are some representative speeds in seconds, shown for both one and five bitplane images.

The Expand operation allows the user to replace the value of a pixel with the largest value in a user-defined subset of its nearest neighbors. The Shrink operation replaces instead with the lowest value. Sometimes referred to as "dilation" and "erosion," these are critically important functions in the "mathematical morphology" approach to image processing. One quick way to find edges in many directions, for example, is to subtract a shrunken image from the original.

Thicken and Thin are binary operations. Again, the user can specify a pattern of nearest neighbors. Thicken will turn on the center pixel wherever that pattern is found, while Thin will turn it off. Like the Expand and Shrink operations, they allow you to grow or reduce various image features to separate the informational wheat from the noisy chaff. Skeleton, finally, reduces a binary image to its linear minimum: a man's outline, for example, will get reduced to a stick figure.

Even More Ops: Relations and Misc

The Relation operations break down into two types. The first represent status flags: You can compare two grayscale images and produce a binary map with pixels turned on wherever a pixel in the first is Less or Greater than, or Equal to, the corresponding pixel in the second. The second Relation operation consists of conditional functions: Threshold, Extract, Maximum, and Minimum.

Threshold reduces gray level images to binary by turning a pixel on only when the gray value is equal to or greater than a user-specified value. If you are interested in real-time image processing, it is imperative to go from grayscale to binary as soon as possible. This is because the time required for an image operation is roughly proportional to the number of bitplanes involved.

Extract produces a binary image representing those pixels in a grayscale image which are equal to a specified value. Maximum and Minimum combine two images by creating a third in which each pixel's value is respectively the greater or lesser of each pair of correlative pixel values ("alleles," to use a biological metaphor).

The Misc menu contains two other operations useful for image processing. The function Level produces a buffer in which every pixel has the same specified value, while Shift moves an image's pixel values by specifiable X and Y amounts.

The Misc menu contains three other items: FixBW, which we have already met, and Histogram and HistEq. Histogram produces a graphic representation of the distribution of an image's pixel values. HistEq uses that information to "spread out" the pixel values in an image to take best advantage of the entire range available. This is the digital equivalent of turning up the contrast on your video monitor.

User Extendability with Scripts

I mentioned at the outset that all of the PhotoSynthesis operations are available both as menu items and via character string "scripts." It is the ability to perform a whole series of operations via scripts that lifts the program head and shoulders above other image processing software for the Amiga.

These scripts, which can be invoked by menu or by other scripts, enable the user to build new functions out of sequences of the built-in repertoire. Each new script expands the functions available for processing images, allowing the user to build up libraries of tools. Twenty scripts for averaging, edging, gray level thinning, and so forth are included with the PhotoSynthesis disk.

This open-ended, recursive ability to indefinitely extend its machine vision toolkit helps make PS an especially powerful utility. For example, the graphics program Pixmate provides a number of interesting image processing options. One of these is a neighborhood operation called Local Contrast Enhancement (LCE) or "sharpen." If a pixel is brighter than its local average, you make it brighter yet; if it is darker, you make it even more dark.

However, although PS does not feature LCE on its menus, we can use scripts to build the function out of more basic tools. Such a script is given in Listing One. I have followed PS conventions in naming it "a_lce_a(bcd).scr." The destination buffer comes first, then the operation name, the source buffer, and (in parenthesis) any other buffers affected. However, some AmigaDOS commands like "copy" cannot handle parentheses in file names, so I would suggest changing this convention.

I will describe the algorithm I used for implementing this function, leaving it for the reader to work out the details from the script in Listing One. As you can see, the script commands exhibit

(continued)

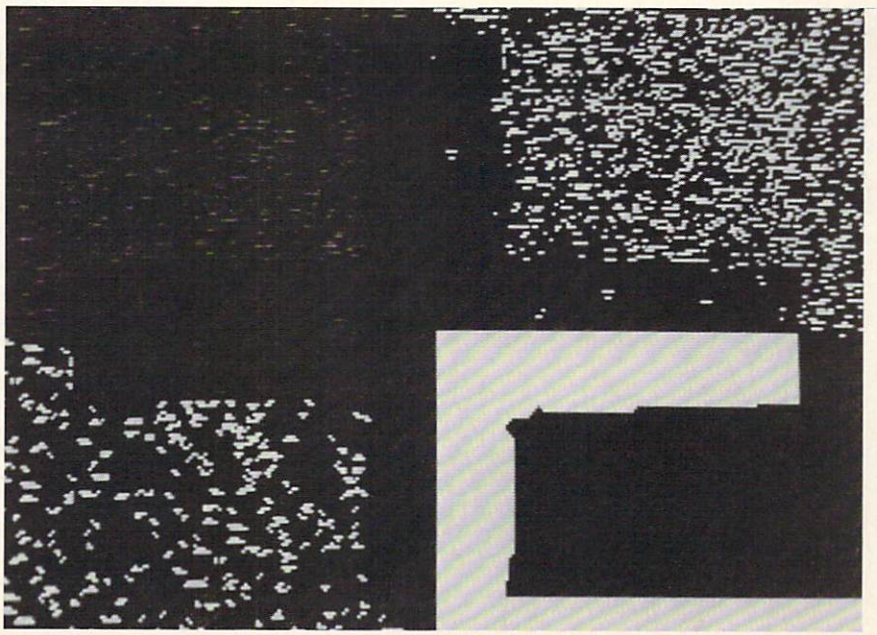


Figure Four

The extraction of the Abingdon Cross.

upper left: *Edge detection emphasizes the background gradient;*
upper right: *thresholded to binary;*
lower left: *cross "noise" is filtered out;*
and lower right: *the background is "grown" together and inverted.*

their own peculiar grammar. For instance, "a add a d" is treated as an abbreviation for " a = a + d," and so forth.

Processing Images

To better emulate the Pixmate operation, we start by calling another script to generate an image that replaces each pixel with the average of its 5x5 neighborhood. Next we compare the original to see which pixel values exceed the average. Since we want to keep the result to 5 bitplanes, we further restrict these to pixels that are also less than 31 (and thus can be safely incremented).

We then add this bitplane of pixels to the original image to enhance the brighter pixels. Using a for loop, we repeat this enhancement for good measure. Finally, we follow a similar procedure for decrementing pixels that are less than the local 5x5 average, making sure that none are reduced below 0.

Picture three, the photograph of the young boy, shows the result of this "sharpening": The bottom half has been enhanced and the top left unchanged. To be sure, the operation is not identical to the Pixmate function, which works in full color and is faster (it takes 46 seconds instead of 112). However, Pixmate is not indefinitely extensible.

As an example of the real power of PhotoSynthesis, I have applied it to a standard image processing benchmark called the "Abingdon Cross." Although the cross shape is clearly visible to the human eye in Picture One, it is deliberately embedded in noise that challenges machine vision techniques.

The extraction process is summarized in Picture Four. The image is first-edge detected in a manner that enhances the background texture. Thresholding results in a binary image that still has some noise — some "on" pixels — in the cross region. After filtering that out, the background texture is "grown" together and the image reversed, revealing the cross.

Summary Justice

There are a number of respects in which PhotoSynthesis falls short of what one might wish for. I have already mentioned some inconveniences in the user interface, and there are others. You cannot edit scripts within the program itself, forcing you to multitask with an editor. However, because the program demands so much CHIP memory, you are recommended not to multitask. Scripts would be more convenient if they allowed for such things as constants and "conditional assembly."

And despite the evident power of the program, it does have limitations. You cannot operate freely on the constituent bitplanes of an image, which inhibits some image processing approaches. You have no direct control over the size of buffers. As we have seen, unlike Butcher 2.0 or Pixmate, PhotoSynthesis only works with black and white (monochrome) images.

My greatest disappointment is that there is no provision for what I earlier called "stage 3" image recognition: image to parameter transformations. For instance, there is no direct way to access the area or relative location of an object we have detected, like the Abingdon cross. (But you can output a preselected subportion of an image to an ASCII file.)

Regardless of all this, I think the examples reveal some of the enormous potential of PhotoSynthesis. A powerful assortment of basic operations plus an open-ended capability for building on that foundation makes an impressive laboratory in which users can experiment with image processing techniques. However, as the manual makes clear, the program does not pretend to teach you everything you need to know about the subject. It is best when used with a textbook or an image processing course.

The PhotoSynthesis documentation is generally well written, unlike most such prose. In addition to the usual reference sections, it contains a helpful tutorial and a brief "Introduction to Image Processing." But alas, this "manual" consists of just a loose bunch of 8.5 by 11's. I regard this as just one more instance of indifference to user convenience: You're forced to buy your own binder. But in the end, the program is so powerful that all these irritants seem unimportant.

Disk Information

PhotoSynthesis is released by Escape Sequence, Inc., P.O. Box 1101, Troy, New York 12180, and retails for $149.95. The package consists of an unprotected disk and 41 pages of documentation. It requires at least 1 Meg of memory, and you would do well to have more.

•AC•

Listing One

```
;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;
;
;  a_lce_a(bcd).scr
;
;  A PhotoSynthesis script for Local Contrast Enhancement
;
;  It expects a 5 bitplane image in buffer A, which will be replaced
;  by an enhanced 5 bitplane version in the same buffer.
;
;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;

script scripts/b_5x5_true_average_a(cd).scr
c greater a b
for %a 1 to 2
d level 31
d less a d
d and c d
a add a d
endfor
c less a b
for %a 1 to 2
d level 0
d greater a d
c and c d
a subtract a c
endfor
;display a
```

The Video Desk

A Real World AMIGA Presentation

by Larry White

Whenever a company introduces a new product, the product is often launched with a press conference and/or party. Often, there is some type of presentation to demonstrate the product's many features. These presentations can range from a single slide projector with a narrator, to a full-blown, multi-media show with banks and banks of synchronized projectors, sound tracks, and even motion pictures.

In the photography industry, new cameras are often touted in this manner. As a frequenter of audio-visual presentations, I've often wondered why I haven't seen camera manufacturers rely more on video to produce these presentations. Of course, the presentation itself is a tool, and all the effort and equipment that goes into the total production is justifiably invisible to the audience when all goes well.

Most major camera manufacturers call in the photographic press at least once or twice a year to introduce their latest and greatest cameras, lenses and accessories. Of course, some products and presentations are more significant than others. Naturally, more time and expense go into presenting what would be considered a landmark product — like the replacement of a camera model that has remained unchanged for almost 8 years.

Recently, the word was out that Nikon, the leading manufacturer of professional 35mm cameras, was about to announce the F4, the next generation of professional cameras. The F4 was to supplement (and eventually replace?) the F3, which was first introduced in early 1980. It was an unveiling rumored and anticipated almost since the F3 was introduced. The F4 introduction would require great fanfare. I was expecting something special, though I had no idea quite how special an event it would become for me.

A few weeks before the scheduled "formal" introduction, some top Nikon people came to the offices of Popular Photography Magazine (where I hang my hat daily) to give a few of us a sneak preview of the camera. During their visit, they expressed surprise at seeing an Amiga on the desk of my Publishing Director, in whose office our meeting was being held. I informed them that, with but one exception (an editor who refuses to give up his manual typewriter), all of our editors/writers were using Amigas.

The Nikon crew said they were planning to use an Amiga to produce their upcoming presentation, though they were still undecided as to what the best method for video output would be. When I mentioned that I had several Amigas in the testing lab, along with three different genlocks they could examine, we adjourned to my office.



Something special is about to happen. Line by line, introduction pulls left, and is replaced by the announcement of the presentation's purpose.

I asked if they were familiar with AMAZING COMPUTING magazine. They were. In fact, I use it as a guide. They then referred to a recent AMAZING article that compared different genlocks. After they learned I was the author of that article, we had a brief discussion of Amiga applications.

We also discussed the difficulties of getting an Amiga purchase approved in a corporate environment, where the powers in charge often feel that compatability with "big blue" is more important than the justification of the expenditure itself. Fortunately, advanced thinkers are more likely to take a chance with an advanced machine. If the technology fulfills a specific need, and find a way around the system. Such was the case within Nikon, Inc.

I have to admit I had an extra degree of anticipation a few weeks later as the press conference began. A large projection screen with a podium to its left stood at the front a ballroom in the famous Plaza Hotel in New York City. As the program began, the lights faded into an impressive slide show with multiple screens, fades, and dissolves. Several new products were introduced. Then, Richard LoPinto, the product manager narrating the presentation, began an extraordinary introduction.

Since Nikon was involved in all aspects of imaging, including electronic imaging, they decided to utilize a new, electronically imaged presentation. The horizontal screen was split into three sections. In the center section, the word "introducing" was formed in a crisp, clean graphic. As the presentation progressed, the left and right sides displayed photographs (projected by conventional slide projectors), while the descriptions on the center screen twisted, faded, shifted, and dissolved in synch with Richard's verbal presentation. Each point he made was complimented nicely with a graphics display.

When the presentation concluded, I raced backstage to congratulate Stan Menscher and Bill Pekala, the two men responsible for the entire presentation. Banks of slide projectors (more than a dozen) were facing the back of the rear projection screen. In the center was a large commercial video projector. At a small table off to the side, Stan Menscher sat behind an Amiga 2000.

Bill explained that he had chosen Pro Video Plus for the presentation since its clean, high-resolution fonts would hold up best when projected onto the large screen. The video projector accepted RGB input, so no special adapter was needed. They had put in a video output board to save the dress rehearsal they presented to their bosses a day or so earlier. At the very last minute, they discovered that the video projector they were using for the rehearsal could not accept the Amiga's RGB analog signal.

The A2000 was equipped with one minor (but brilliant) modification — a simple minijack on the right side of the keyboard. The jack was connected so when closed (shorted), the computer would have the signal as generated by manually pressing the up-arrow key. Since, in manual playback, Pro Video Plus uses the up arrow key to advance frame, this would allow the presenter to use a simple control switch at the podium.

Since an audio-visual syncronizer was already being used for controlling the slide projectors, this jack was actually connected via the controller during the presentation. As a final touch, a small black and white TV was positioned on the podium and wired as an additional monitor to give the presenter the current video display at all times.





(Top)
Menu-like controls let you set justification by using arrow keys and return key.

(Bottom)
Move arrow key to select color for current line. Instructions appear in current font

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The presentation was produced entirely with Pro Video Plus, a program that possesses some remarkable capabilities. First though, a few things that Pro Video is not.

The program is not multitasking and is not compatible with other Amiga fonts. You can't even use your mouse. (Pressing the mouse button can sometimes cause the system to lock up when Pro Video is running.) In exchange for these inconveniences, you get every possible bit of memory dedicated to giving you the highest quality graphics possible. The images use 672 pixels by 440 scan lines.

Like its predecessor, Pro Video CG1 (still available from Shereff systems), Pro Video Plus is a sophisticated character generator written with video professionals in mind. The program is ideally suited for producing a video bulletin board similar to those found on a cable TV network channel. You can store up to 100 pages (2,600 with additional RAM), which can be cycled automatically for playback. Unlike CG1, Plus lets you import HiRes IFF images for backgrounds.

Transitions between pages can be selected from over 90 effects. Some allow transition within a specific line (a feature well utilized in the Nikon presentation). The speed of each transition is adjustable.

You cannot use your standard Amiga fonts (or such fonts produced by Zuma, or Calligrapher), but Pro Video Plus comes with 4 styles, each in four sizes (32, 48, 64, and 80 scan lines). Add italics and seven multi-color effects for over 200 variations in up to 16 colors. You can even use color cycling or flashing effects. Additional fonts are available in sets of 4. Pro Video is essentially menu-driven and makes extensive use of the arrow keys for making selections. The instructions are comprehensive and easy to follow.
The presentation for Nikon was the first Amiga outing for all involved, and I considered it a rousing success. It demonstrated what can be accomplished with an Amiga and the proper software.

As I spoke with the Nikon people immediately afterward, both Bill and Richard seemed intent on using the Amiga in future presentations. When I suggested they consider using a program like Animator Apprentice to turn Richard into a cartoon character, and then genlock him over a video image of the next product, minds started racing into high gear.

I'll keep you posted.

•AC•

Gizmoz 2.0

Productivity Tools for the Amiga

By Steve Carter

I bought Gizmoz 1.0 back when the software choices for the Amiga were Deluxe Paint, Textcraft, and Gizmoz. I have used almost all of the tools in the package more than once, and enjoy many on a regular basis.

But, like most things, there were aspects of Gizmoz 1.0 which I thought could use a little work, especially after the release of AmigaDOS 1.2. For instance, none of the String Gadgets were auto-active, which was understandable since DOS 1.1 didn't support that. Memopad was a simple, quick and dirty text editor, perhaps a little too much so. And I never was able to get Rollodex to dial phone numbers for me.

So, what do I think about Gizmoz 2.0? Well, hot and cold. Many of the tools were improved, though mostly in ways different from what I had in mind. They also added several new tools. I would like to go through Gizmoz 2.0 a tool at a time. First, though, I'll cover some of the changes made basically on all of the tools.

The file requester has been changed on most of the tools. Gizmoz now sports a new file requester. The new requester requires that you retrieve from the disk those files you want. If you know the file name, this can be an annoying delay. There are file requesters available that give you the best of both worlds (Scribble is an example). They begin the process of file fetching, but will also accept and act on a file name entered, or any other action offered, instead of waiting until the entire directory is loaded.

To Gizmoz's credit, the file requester does have some nice features. The directory section has a title, usually FILES. As you click on it, it cycles through and displays the DIRECTORIES, VOLUMES, and FILES. Double clicking on FILE, DIRECTORY, or VOLUME will select and retrieve your selection. The proportional scroll bar updates the display area as you move it, not after you release the mouse button. Keyboard equivalents exist for moving through the files. While the String gadget for entering your file is not auto-active, hitting return will activate it, so you don't have to click in it with the mouse.

I wish I could say that all the String gadgets in all the tools were fixed to utilize DOS 1.2's auto-active feature, but I could find only one tool that was. The rest either required a mouse click in the String gadget, or used the method the file requester employs - clicking or hitting return once before typing.

Finally, a handy feature was added to most all of the tools. A double click with the right mouse button anywhere in the tool will reduce the tool to the size of the menu bar, thus making your Workbench a little less cluttered, and saving chip RAM. Double clicking again with the right mouse button on the menu bar of the tool will restore it.

ORGANIZERS

Memopad

Memopad is my favorite and most frequently used Gizmoz tool. It is similar in function to Notepad, the quick and easy-to-use text editor. Unlike Notepad, Memopad uses only the system font, and it does not have word wrap.

Memopad now has column and line number indicators, as well as an indicator for Insert or Type-over mode. The Menu is sparse, offering only PROJECT, EDIT, and ABOUT. PROJECT has the usual facilities: NEW, SAVE, LOAD, etc. EDIT offers a search and replace function and the usual CUT, COPY, and PASTE operations, as well as a SELECT ALL option. ABOUT simply displays a copyright notice and the version number.

Text positioning is achieved through vertical and horizontal proportional scroll bars which reposition the text as you move the bar. This is an important upgrade from the old version which repositioned the text only after you let up on the mouse button. You may also use the cursor keys to move through your text, but this is now a painstakingly slow process. My rough tests indicate that scrolling with the cursor keys is 50% slower in version 2.0 than in 1.0.

Like most of the Gizmoz tools, Memopad has many keyboard shortcuts or equivalents, as well as functions that can be accessed only with keystrokes. These include move forward and backward one word, or move to the beginning or end of a line, etc.

I was quite disappointed that version 2.0 of Memopad didn't include word wrap. Something as simple as the method employed by NotePad would have been a great help. This is evident when importing text files created by an editor using word wrap. Using Memopad, those files will stretch off into the next room, requiring a search and replace session to make your file usable in Memopad.

All in all, Memopad 2.0 is only a slight improvement over Memopad 1.0. But either version makes a great replacement for Ed or Editor in your C directory. In fact, I've removed both ED and Editor, renamed Memopad to ED, and placed it in the C directory. Now all calls to Ed bring up Memopad.

One final comment and hint: Memopad, Rollodex, and Calendar do not have built-in printing facilities. Rather, they rely on Black Book to do their printing. When using Memopad, a simple way around this inconvience is to save your file to PRT:. Just bring up the file requester, type PRT: in the file gadget, and click on save. Immediately you will see a message stating "Error Saving File Icon". Just click on "OK", or hit return, and your file will be printed. The Error is caused by Memopad trying to send the Icon information to the printer. It won't harm anything.

Rollodex

Rollodex is pretty much what the name implies - an electronic version of the standard desktop card file, with a couple of computer-only features.

You can type whatever you want in whatever format you want, five lines to a card. Cards in the same file can be in many different formats. This flexibility has a drawback that is plainly exposed by a new feature in version 2.0.

The feature is CARD SORT, which allows you to sort the cards by fields. But what fields? Well, using SORT SETUP, you type F6 at the beginning and end of the field you want to sort by, which is nothing more than a particular spot on the card. Sorting by states in an address file would require that all state codes manually placed in the cards be in exactly the same spot on each card - a hit and miss situation.

Other features include the ability to click on any letter to find that section of your file, and arrow gadgets to scroll through the file. Menu options let you FIND, CUT, COPY, INSERT, and ERASE CARD. Other options give you the TOTAL CARD COUNT, TOTAL INDEX (letter) COUNT, and CARD NUMBER COUNT (relating to the Index).

Besides CARD SORT, V2.0 adds two more gadgets, REPL/INST and TOUC/PULS. The first toggles between type-over mode and insert mode. The second toggles touchtone and pulse dialing.

Calendar

Calendar is a handy program that lives up to its name. You are presented with a calendar of the current month, wherein you may enter whatever information you need for any or all days just by clicking on the desired date. After the information has been entered, that date is highlighted. Using the Black Book printing utility, the calendar for any given range of dates may be printed.

Calendar also includes an appointment reminder feature which will flash the screen and/or beep at you, keeping you informed of daily events and responsibilities. As far as V2.0 goes, I found no obvious changes from V1.0.

Black Book

This is the all-purpose printing utility for Memopad, Calendar, and Rollodex files. When you open a file, Black Book determines what type it is, and offers appropriate options for each file type.

To print a calendar, you can set up a range of dates to print, the minimum lines per day to print, and the minimum blank lines per day to print. Or you can request that Black Book print only those dates with appointments.

To print a Rollodex file set up a range of indices, one or two cards across the page, the number of blank lines between cards, form feed or not, which of the five lines is to be printed in boldface, and, finally, choose which of the five lines to be printed, one, all or any combination.

When printing a Memopad file you have one option, Start Printing. There are no formatting options (just like Memopad).

Having a separate printing tool is not as awkward as it may seem. After all, we are mulitasking. I found no obvious changes from version 1.0 to version 2.0

HotKeys

Hot keys is a very flexible macro utility which allows you to set up any AlphaNumeric key in combination with the Control, Alt, Left Amiga, and Right Amiga. The Control key can be used in combination with the other three, requiring three keys to be pressed simultaneously to issue the macro.

You may also set up macro with no qualifiers (combination keys), so you can assign each key a total of eight separate macros. The program is fairly easy to use and, as you might expect, does not hang around once you've defined and assigned your macros. HotKeys can be run from Workbench, or CLI.

ACCESSORIES

Terminal

A simple yet powerful Terminal Emulator with many additions to version 2.0. Terminal supports 10 different terminal types, with baud rate from 300 to 57,600, Carriage Return/line feeds can be translated coming or going. Transfer protocols available are Text, Xmodem, Simple Modem, and Amiga Binary. Last but not least, SAVE INCOMING TEXT (Test Capture) is supported.

I appreciate the advanced features and convenience of the more sophisticated telecommunications programs. But for someone just learning about telecommunications, or the casual user, you can't beat Terminal.

Compress

Compress is a file compression utility that, to me at least, is quite useless. It is not at all compatible with ARC, and probably not with ZOO either. It doesn't compress a file as small as ARC will. With ARC available as Shareware or Public Domain, what's the point? No change with version 2.0.

FreeList

A graphic display of your free memory shows both Chip and Fast memory. Cute but, for most of us, not very critical. Again, there are at least two similar, if not superior, public domain versions available. No change from version 2.0.

PopUp

A handy Electronic cheat sheet. Version 2.0 comes with AmigaBasic Commands, an ASCII reference table, and an AmigaDos Command chart. PopUp lets you scroll through the list (using arrow keys only), and will pop to the front or behind other screens. There is a search function, and just about any text file can be used by Popup. There is absolutely no change from version 1.0. Even the old file requester is there.

Encrypt

A file coding or encryption utility that uses key words you supply to encrypt your files. The key word is case sensitive. As with your ATM bank card, only worse, don't forget your code. If you do, you've got garbage for a file. Not knowing all that much about encryption methods, I wouldn't guess as to the security of encrypted data. No apparent change from version 1.0.

SetPriority

Utility that allows you to prioritize the tasks running on your Amiga. Sounds great, huh? If you think you can use it, you'd better know what you are doing because, as the manual indicates, you could lock up your machine. No apparent change from version 1.0.

CALCULATORS

Calculators includes a Programmer's, a Financial, and a Scientific calculator. The only one I have used is the Financial calculator. It works very much like a standard Financial calculator. I have compared it to both a TI and a Radio Shack version, and it is functionally identical.

A nice feature not found on the Workbench calculator is a tape display, which you can display, clear, or send to your printer.

(continued)

I do have a little trouble using these calculators with a mouse, and since my Amiga 1000 has no "+", "/", or "*" on the numeric keypad, using the keyboard exclusively is almost as awkward. Amiga 2000 and 500 owners should have an easier time with it. I found no changes from version 1.0, but then I didn't look that hard, either.

AUDIOVISUAL

Announce

A rather elaborate version of AmigaDOS's Say. There are sliding gadgets for PITCH, VOLUME, CADENCE, and SAMPLING FREQUENCY. Announce also features the ability to activate a sizeable animated face, toggle to monotone, and male and female voices.

Using Announce is as simple as clicking in the ENGLISH string gadget, entering what you want said, adjusting the various gadgets, and clicking SPEAK. You can also enter directly into the PHONEME string gadget, and Announce won't translate your text.

A nice feature of Announce is that you can use it from the CLI to recite text files. Every option that can be accessed from the Workbench version is available as CLI Command options. You can also save the Phoneme to a file. I found no changes from the 1.0 version.

SuperLife

This is a Gizmoz version of the classic game of Life, one of the first computer games. Other than spectacular progress from the earliest BASIC version on who knows what machine, there is not a whole lot here to spark more than passing interest. Again, no apparent changes were found in the new version.

Cuckoo

A very elaborate clock portrayed—you guessed it—as a cuckoo clock. Cuckoo comes complete with a little bird that appears every hour on the hour, as well as an alarm. Cuckoo also has a tick-tock sound that can be turned off. Perhaps it's better to say the tick-tock sound can be turned on, because it can become annoying. I imagine that's why Cuckoo comes up with the sound off. No changes from version 1.0.

Graph

Graph is a totally rewritten (from version 1.0) stand-alone (almost) graphing utility. It graphs data in Pie, Bar or Column form, relying on scripts to do the job.

The Script requirement is new, and it is this feature that makes Graph somewhat dependent. The manual lays out some minimal parameters and one example. There is also an example graph in the AudioVisual directory. With a little trial and error, I was able to produce a couple of graphs fairly easily.

BENCHTOOLS

This directory contains a group of utilities new to Gizmoz with the release of version 2.0.

FastPrefs

Workbench/CLI utility designed to quickly change some or all of the preference settings. Through a little dance routine with Preferences, you set up those items that are to be changed, select those items in FastPrefs, give your file a name, and save it.

Hereafter, a simple double click on that file's icon will instantly change the settings. You can also run FastPrefs with the file name as a parameter with the same results.

Once you get the hang of the interaction between FastPrefs and Preferences, the program works well. But you should be aware that there are at least two Public Domain versions that will do the same job. I believe they are called Pref and Prefs. However, neither can be used through Workbench.

QuickMouse

I like the idea of this Mouse accelerator, of which there are several Public Domain versions available. However, QuickMouse does something I believe is unique. When you move the mouse quickly, QuickMouse accelerates it, making these moves much shorter and easier. When you move the mouse slowly, QuickMouse does nothing, making these moves more accurate. Other accelerators apply a constant acceleration factor to all mouse movements, making precise moves difficult.

While I like what Digital Creations did here, I wish they had included a feature incorporated into the Public Domain version - the option to specify different acceleration rates. QuickMouse works at only one setting. However, it is sufficient as such, so lack of this feature is not a major inconvenience.

JoyMouse

This little utility allows you to plug an Amiga Compatible (digital) joystick into joystick port #2. The effect is similar to using the keyboard equivalents for the mouse. In fact, to activate the right mouse button, you must use the keyboard equivalent. JoyMouse allows you to make do with a joystick, should your mouse go to that big mouse trap in the sky. Barring that, leave JoyMouse in its hole.

IconMaker

Though it took me a while to appreciate IconMaker, I now feel that between IconMaker and Memopad, Gizmoz is worth purchasing. Iconmaker does just what it says—sort of.

The idea here is to take any IFF picture or brush and turn it into any of the seven different icon types. IconMaker puts into one mouse-driven program what used to require three CLI-only Public Domain utilities (Iconize, Recolor and IconType).

What's more, it allows you to create double-image icons—you know, like the Garbage Can icon with the lid that opens when you click on it. Here, it's as simple as loading and sizing two IFF Pictures, recoloring if necessary, selecting the icon type, and saving.

IconMaker even allows you to set Icon Default Tools, Tool Types, and Stack Size for those icon types requiring these items.

Summary

In many cases, you can probably pick out a tool that has a good public domain equivalent and, if that's all you need, then maybe Gizmoz isn't for you.

However, I think most people will find it easier and more cost effective to purchase Gizmoz. Overall, Gizmoz 2.0 is a good value. The programs are well written, and get the job done. The instruction manual is also helpful, with its fairly well written and consistent style - something many public domain programs do not have.

Gizmoz ***$40.00***
Digital Creations Inc.
1333 Howe Ave
Sacramento CA 95825

•AC•

World of Commodore

Toronto, Canada

by Ed Bercovitz

Editor's note: Due to a variety of problems, this article, which originally would have appeared in January's or February's issue, did not run until our March issue. Sometimes it is difficult to understand the publisher's time scale. However, the article contains a great deal of product information which we felt our readers would find useful.

The 1988 World of Commodore show was held from December 1-4 at the International Centre on the outskirts of downtown Toronto. Besides being the 6th annual World of Commodore, the show also marked the 30th anniversary of the founding of Commodore Business Machines. To commemorate the event, the Commodore booth (which occupied approximately 20% of the show's floor space) presented an exhibition of Commodore products and advertising posters illustrating the company's evolution.

Before becoming a major computer manufacturer, Commodore produced and marketed a variety of business and consumer products including typewriters, hand and desktop calculators, digital watches, and even console stereos! The complete family of Commodore computers was also on display, from the VIC-20, PET and Plus-4 to the C-64 and 128, up to the Amiga 500, 1000 and 2000.

The World of Commodore show has traditionally consisted of three components. First, are the stage presentations and seminars. During the 4 days of the show, there were over 20 seminars and 47 stage presentations, all at no additional charge above the daily admission price of $8.00 US for adults, and $6.50 for students. While the World of Commodore used to be a show oriented toward C-64 and 128 owners, over the past three years the Amiga component of the show has assumed an increasingly higher profile. This year, two thirds of the seminars and ninety percent of the stage presentations were directed towards Amiga owners.

Another component of the World of Commodore is the group of software and hardware developers who use the show to promote existing products, unveil new products, and preview products under development. It also offers developers an unparallelled opportunity to meet with current and potential users of their products. The developer contingency at the show also reflected the growth of the Amiga market. Of the 44 exhibiting developers, 35 have Amiga products as the sole or major part of their business operations. In fact, the number of non-Amiga developers was so small it was matched only by the number of Amiga magazines exhibiting at the show!

Undoubtedly, the reason many people attend the show is simply to shop. With 50% of the floor space devoted to retail, there is certainly ample opportunity for shopping. Dealers have an opportunity to reach a large number of customers in a short amount of time and ring up healthy sales. Users have a good opportunity to buy the new system, or piece of hardware or software they've been saving for. With so many dealers in one place, comparison shopping is very easy. Some real bargains are available, especially on the last day of the show. Retail sales is one of the major factors contributing to the ongoing success of World of Commodore. For example, one Amiga user group chartered a bus to drive the 120 miles to Toronto. Between the 35 people who took part in the excursion, they spent nearly $12,000 at the show.

Commodore Canada assists the dealers by providing an onsite warehouse at the show so dealers can replenish their stock during the show. Although final figures weren't available at this writing, preliminary figures indicate that somewhere between one and two thousand complete systems were sold during the four days, plus countless numbers of peripherals.

While this system total includes all types of Commodore computers (C-64/128, MS-DOS, and Amigas), early totals indicate that somewhere between 50 and 70% of the systems were Amigas. In fact, on Saturday the show warehouse ran out of 2000s and had to bring in more from the main Commodore warehouse. It was nice to see a steady flow of Amigas being trundled, wheeled and carried out to new homes.

So what's new and interesting?

Developers often use shows like World of Commodore to officially launch new products. The problem in reviewing a show is that by the time the article reaches the hands of the readers, these hot new products have become "old" news. So in the following report, I'll touch briefly on some of the new releases (just in case your local dealer's idea of "current" is Workbench 1.2). I'll also report on forthcoming products that were demoed, or that we managed to coax information.

(continued)

The Disc Company was showing off Version 2.0 of KindWords. It adds a new 100,000-word dictionary and 40,000-word thesaurus (both from Merriam Webster), auto and manual hyphenation, new sans serif, math and Greek fonts, auto and manual hyphenation, several new menu commands, and improved file requesters. Upgrades are $20, or free if you bought KindWords 1.0 after September 30, 1988.

KindWords 2.0 is also being offered in a new bundle called Publisher's Choice. Other products in the package include Pagesetter 1.2 from Gold Disk, Headline (a collection of 35 headline fonts), and Artist's Choice Artpack (a collection of 200 IFF clip art graphics). The latter two products are both from The Disc Company and will likely be made available in an unbundled format in the near future. As an added bonus, Publisher's Choice also includes over $1000 in discount coupons for Hewlett-Packard, Panasonic and NEC printers, Spirit Technology memory upgrades, C Ltd hard disks, and laser printing and typesetting services.

Also demoed by the Disk Company was Superback, a new hard disk backup program which claims to be able to back up 20 megs in 20 minutes. As for future products, the Disk Company will be releasing a European-developed, 3D animation package called Imagine in the Spring. It will run on machines with as little as 512K.

Datamax unveiled the 1988 version of their Canadian income program. In addition to incorporating all of the changes arising from this year's major tax revision, the calculation speed of the program has been increased. A new option has also been added to determine efficient allocation of deductions between spouses. More significantly, Datamax announced the mid-January release of a US version of their WYSIWYG income tax program (IFF representations of actual tax forms are filled out onscreen).

The U.S. 1040 version of Amiga-Tax will include forms 1040, schedules A-E, R, SE, IRA calculations and more. The software will print IRS-approved tax form facsimiles you can simply sign and mail.

In the battle of the Amiga paint programs, **Electronic Arts** fired off the latest salvo as they showed Deluxe Paint III, scheduled for March release. A major dimension has been added to the program with the addition of Anim file compatible animation capabilities. Consequently, DP3 is now being billed as an "integrated" paint and animation program. Some of the new features include AniPaint, or the capability to paint in multiple frames simultaneously, the ability to use a multi-frame brush as an animation, and a facility to move or rotate brushes across a user defined number of frames.

On the paint side, improvements include doubling the maximum size of the color palette to 64 colors by using extra half brite mode. Painting on the overscan portion of the screen has been added, and extra brush wrap and tint modes have been created for more special effects. Other performance enhancements include the elimination of bugs such as those associated with the use of a large number of fonts.

MichTron/MicroDeal is one of an increasing number of developers once solely in the Atari ST market, but now expanding their scope to include the Amiga. Over the past few months, they have gradually increased their stable of released and planned Amiga products. (Their entertainment software is marketed under the MicroDeal label, while MichTron handles productivity and development packages.)

In their show booth, MichTron/MicroDeal promoted various new products including GFA BASIC, Amiga Devpac (billed as a powerful assembly language development system capable of assembling source code at the rate of 70,000 lines per minute), Fright Night (an arcade-style game based on the movie of the same name), Zero Gravity (volleyball in space), International Soccer (permits four people to play simultaneously with the addition of a $15 adapter that converts your parallel port into two more joystick ports), A.M.A.S (an 8 bit stereo audio digitizer with a fully implemented MIDI interface), and the Ultimate Soundtracker (a professional level sound editor).

One product that really caught my attention was a new piece of software called VIVA, or Visual Interfaced Video Authoring. This product truly breaks new ground in the world of Amiga software. With the aid of VIVA, non-professionals can use a mouse/icon graphical interface to program and develop multi-media presentations. The authoring system can utilize and control a wide range of devices such as laser disk players, genlocks, video digitizer, touch screens, CD-ROMS, or graphic tablets. A run-time version of the program called VIVA Presents allows the use of programs generated under the authoring system.

Interactive video and multi-media presentations are new areas of technology just beginning to be explored. If VIVA is as solid and powerful as it appeared during the demonstrations, it has the potential of making the Amiga a major player in this emerging market, both as a development system and as the beneficiary of spinoff applications.

Antic Publishing, another developer coming to the Amiga from the ST market, followed up on their recent releases of Zoetrope, Videoscape, and Sculpt parts packages with the release of three new games: Pioneer Plague (being billed as the first Amiga game in HAM mode), Crash Garrett, and Stir Crazy with Bob. Antic will also be launching Amiga Plus, a magazine and disk, at AmiEXPO in New York in March.

One booth I almost overlooked at the show was that of **Incognito Software** (What do you expect with a name like that?) I'm glad I didn't, because if Icognito manages to bring all their planned products to market, they could end up being a major player in the Amiga world. Incognito picked up the rights to Vyper and Footman from the now defunct Vertex/TopDown Software. They are also adding Snake Pit, Targis (two maze type games) and Kingdoms of England to their stable of entertainment software. Kingdoms of England is a one or two-player game scheduled for a February release. It is described as a combination of Faery Tale Adventure, Firepower and Defenders of the Crown.

On the productivity side, Incognito is currently marketing Atredes, a graphics-oriented BBS system. They will be shipping Opticks, a new ray tracing program, in January. With features like improved user interface, 24 bit file save, 3D spec support, HAM display and save, this program is raising the stakes in the battle for best Amiga image-rendering software.

(continued)

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Incognito is looking to expand into hardware products with low cost ST506 hard disk controllers for all Amigas, as well as parallel and serial cards planned for first quarter 1989 shipments. Other tentative hardware projects for communications, music, and add-on memory are being targeted for shipment late next year.

A company suspiciously absent from the show (since they are located in Toronto) was **Gold Disk**. Although they didn't have a booth, Gold Disk personnel were seen wandering the floor regularly during the show. Their explanation for not having a booth was that their products were being demoed and sold in retailers' booths throughout the show. MovieSetter officially shipped during the show, with sales appearing to be pretty brisk. A MovieSetter multi-minute animation shown at various show locations clearly demonstrated why this product is already starting to earn a reputation among both amateur and professional animators for its ease of use and advanced features.

Gold Disk isn't resting on its laurels, however. Professional Draw should have shipped by the time you read this article. Updates are also planned for Professional Page, and will provide better dot matrix support and the ability to use encapsulated Postscript files from Pro Draw. Another product which should be available early in the new year is a full-featured word processor aimed specifically at writers. With products covering text processing, graphics, and page layout, Gold Disk will be able to market an integrated system of desktop publishing software.

SoftLogik, one of Gold Disk's potential competitors, was showing PageStream (formerly known as Publishing Partner Professional). I say "potential" because this product has been advertised for more than a year, and is still unreleased. From what I've seen, this product could be a viable and cheaper alternative to Professional Page, especially if you are working with a high-quality 24 pin printer. SoftLogik has been showing the beta version at various shows for more than six months. At each show there seem to be fewer bugs, but the version at World of Commodore still appeared in need of a bit of work (even though the disk label said Version 1.0). SoftLogik is to be commended for showing up at Amiga shows to demonstrate the current state of the software, and taking the flak for repeated shipping delays. However, it would probably be a good idea for them to mount a major push and get the software out the door. The latest estimated release date is now mid to late January.

Undoubtedly, the biggest output from a product at the show was **ASDG's** photomural of the Toronto skyline. This image measured approximately six by eight feet, and was produced using ASDG's interface and software, the **Sharp** JX-450 scanner, and an HP Paintjet. The mural was "tiled", or produced by printing individual segments of the picture on separate pieces of paper, then taping them together. The result was very effective and dramatic demonstration of the system's capabilities.

One surprise announcement was that ASDG was not going to market the SpectraScan. They are not dropping the product, just the name. SpectraScan will now be known as Professional ScanLab. Perry Kivolovitz explained that they felt the new name more accurately reflected the system's capability. ASDG's close working relationship with Gold Disk, and the natural complementarity of the companies' products, may have also contributed to a desire to describe their products as "professional" in name, as well as capabilities.

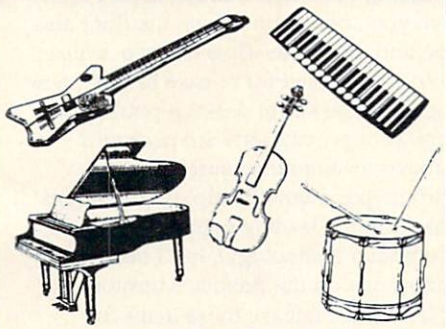
For those of you tempted by the color capabilities of the ScanLab and the Sharp scanner, but put off by the price, ASDG will be offering a more economical alternative in early 1989. Sharp is introducing the JX-100, the world's first hand-held color scanner with 200 dpi resolution. With 6 bits per pixel, the JX-100 will scan a 4 by 6 inch area in black and white, grey scale, or color with scanning time ranging from 10 to 60 seconds. ASDG's ScanLab 100 software and hardware will work on all Amiga models. The JX-100 has a suggested list price of $995, while ASDG's prices hadn't been finalized by press time.

Over the past several months, more and more commercial and public domain products have been released with ARexx compatibility. While I found the idea of having the ARexx capacity in a program intriguing, I hadn't seen a real "killer" demonstration of two programs working together. Then I stopped in at **Precision's** booth.

Dan Browning was running the newly released Superplan and Superbase Professional 3, with both programs calculating and exchanging data through an ARexx port. This was one hot combo! Just watching this demo got my imagination going and made me want to dig out my ARexx manual and finally start getting up to speed on the program. The real beauty of Precision's implementation is that you don't even have to buy ARexx to make use of its capabilities within Precision's products, since Superbase Pro and Superplan contain all the necessary support functions.

Superplan looks to be an excellent product, even without its ARexx capabilities. While it will be going head to head with other high-end spreadsheets like Maxiplan and Analyze!, Superplan is much more than just a another spreadsheet. For $149, you get a 74 function spreadsheet with macros, project management capabilities with critical path, time and expense planning, resource allocation, gantt and pert charts, plus a full business graphics module with 18 types of graphs with a wide choice of combinations of titles and fonts.

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Another product with an Arexx interface unveiled at World of Commodore was Nag Plus 3.0 from **Gramma Software**. (How could you not trust a software company with a name like that!) Nag is described as a "personal organizer", and was previously being sold as shareware. Taking the concept of a calendar and scheduler, NAG adds digitized sound and synthesized speech, a basic text editor for notes and quick correspondence, and a modem dialer. At $79, it isn't cheap. But unlike a live personal assistant, it doesn't make mistakes, take coffee breaks or ask for raises. If you've got a lot of activities to keep track of, this product might just be for you.

While there wasn't much new on the video scene, **Mindware** did announce an International Amiga Animation Competition for animations run under PageFlipper Plus F/X. Four first prizes, totaling $3500, will be offered for commercial and non-commercial animations longer and shorter than 20 seconds. The submission deadline is March 1st, 1989. The winners will be announced later that week at AmiEXPO in New York. You can get further information and technical support via Mindware's new BBS at 705-737-5017, or via their new toll-free number at 800-461-5441.

Over in the games arena, **First Row Software** was announcing their first three games for the Amiga. This is another company that has been producing IBM, Mac and Atari products and, having smelled the coffee, has now decided to expand into their market. Given the Amiga's NTSC capabilities, it is fitting that all these games are related to TV. The Honeymooners and Twilight are game clones of the successful 1950's television series, while Primetime is an adventure/simulation where you take on the role as president of a major network. (You Amiga owners who are fans of Max Headroom will finally get the opportunity to put Max back on the air!) All three games are scheduled to be released by February, 1989.

Another new games producer at the show was **Image Tech**, a sister company to AX magazine. (It's interesting to see how many magazines are now getting into software publishing.) Their first game, Kikugi, was shipping at the show. Kikugi is based on a Japanese game the objective of which is to jump pegs and remove them from the board until only one peg remains in the center. Similar board games have been produced for many years, but Kikugi has more variations than the Kama Sutra. How about substituting Pacmen for pegs, or seashells on a beach? Both the graphics and sound are excellent. This game should appeal to anyone tired of testing their reflexes on arcade-style games, and wants instead to exercise their cerebral capacity with a bit of strategy play.

By the time you read this, **ImageTech** should have already shipped Dungeon Quest, a graphics adventure. Also, a game using Haitex's 3D specs is planned for the Spring. On the non-game side, Image Tech is working on Gateway, a Workbench substitute, as well as a yet unamed music program to be compatible with both Sonix and Deluxe Music.

Undoubtedly the hottest selling game and piece of software at World of Commodore was **ReadySoft's** long awaited release of Dragon's Lair. During the show, I watched as the pile of boxes eroded, and retailers from the floor came back to replenish their supply. The final product certainly seemed to silence those doubters who wondered if all the video and sound of the arcade game could be compressed into a home computer version.

ReadySoft was also showing off Amax, the Mac emulator, which had first been unveiled at the World of Commodore in Philadelphia. On hand in Toronto was Simon Douglas, Amax's developer, who had flown up from New Zealand to help finish the programming for the scheduled late January/early February shipping date. The hardware side of the emulator had grown a bit with the addition of a connector to allow the hookup of a Mac compatible floppy drive. Amax certainly looked impressive, especially when it was displayed on a Moniterm monochrome 19-inch monitor connected to a 2000.

Dragon's Lair and Amax have both overshadowed Flashback, ReadySoft's other planned product. Flashback is a combination of hardware and software that allows you to back up and restore your hard disk with a Beta or VHS VCR.

(continued)

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A similar product has been marketed in the MS-DOS world. Given the increasing number of Amiga hard disks in use, Flashback, assuming it is reliable and as fast or faster than floppies, should be a real winner at only $99.

Speaking of monitors, one of the non-Amiga specific items that caught my eye was the new NEC line of DataSmart monitors, two of which were being used in stage displays. The DataSmart is a series of multi-sync monitors with screen sizes of 20, 26 and 30 inches, with top end resolutions ranging from 1024 by 800 to 640 by 480, depending on model. All models feature composite, Super VHS, RGB and VCR connections, as well as an internal stereo amp and 2 speakers and terminals for additional external speakers. With weights ranging from 55 to 137 pounds, you're not likely to put one of these on top of your Amiga. If you're looking for a monitor with a real eye-popping display, and have $2800 to $5000 to spare (that's suggested list price of course), you may want to check one of these models out.

Wrapping it up

Well, both my time and space is running out. There's much more I could tell you about—both from the floor and behind the scenes (like the two Amigas LANs scheduled for release in 1989, new and very powerful desktop publishing and productivity software packages under development, and hardware prototypes that will help put the Amiga back on the leading edge of personal computer technology), but I don't want to intrude on the Bandito's territory. Therefore, I'll leave these items for unveiling at future shows.

While the 1988 World of Commodore was a success, it may also mark a milestone in the evolution of Amiga-oriented computer shows. In 1989 there will be three World of Commodore shows, three AmiEXPOs, two Comdexes, and numerous Amiga Forums, not to mention other regional or specialized smaller shows such at Sigraph.
With the cost of exhibiting now running to several thousand dollars, it is obvious that the majority of Amiga developers

Companies Mentioned

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Image Tech
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Adelphi, MD 20783
(301) 439-1151

Incognito Software
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SoftLogik Publishing Corporation
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(314) 894-8608

The Disc Company
3135 South State St.
Ann Arbor, MI 48108
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have neither the time nor the financial and human resources to try and attend all scheduled shows. In the future, they will have to be more selective in deciding which shows will give them the best return on their investment. Amiga users will no longer be able to attend a show and feel assured they will see a significant representation of the available market of Amiga software and hardware.

In some ways, this growth is a sign of the maturation of the Amiga market. Ideally, one or two of these shows will emerge from the pack and become THE show to attend for both usesr and developers. Hopefully, the World of Commodore in Toronto will emerge as such.

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About Commodore Canada

While Commodore may be a multi-national computer company, each of its national corporate subsidiaries has their own unique "personalities", and strengths and weaknesses. Since the World of Commodore was the brainchild of the Canadian organization, we thought our readers might be interested in a profile of Commodore Canada's operations.

Commodore Canada is a big operation, both in terms of its national market, and in comparsion with other Commodore national offices. Last year's sales totaled approximately $60 million, with a $100 million target being set for this year. This represents 7 to 8% of Commodore's worldwide revenue. On a per capita basis, it puts the Canadian organization in an ongoing struggle for second place with their Australian counterparts, with Germany still enjoying a comfortable lead. With more than 40% of the annual sales being Amigas, Canada has provided a major portion of the worldwide growth of the Amiga, as well as supporting local Amiga hardware and software developers.

One of Commodore Canada's secrets of success is their innovation in marketing. In an effort to penetrate the educational market, Commodore offered local school boards a special "buy two get one free" promotion on Amiga 500s. In the corporate world, they have not only targeted direct sales to companies, but they've also established an Employee Purchase Program, whereby any group of employees can band together to arrange very attractive volume pricing. While employer involvement is preferred, the program is sufficiently flexible to allow employee groups to participate even when the parent company doesn't even own Commodore products. With such efforts to get in through both front and back corporate doors, Commodore Canada has been able to sell 500 Amigas to the Alberta telephone company, sign up 25,000 Air Canada employees on the purchase program, and is even conducting negotiations for a similar program for employees of DEC!

To succeed in the home market, Commodore Canada realized they needed a strong dealer network. Last year they hired 34 high school, college and university students who, after 14 days of training, became the Amiga Action Team. The Team spent the summer crisscrossing the country, visiting each of the more than 400 dealers 3 or 4 times to put on demonstrations, training programs and promotions. To support this marketing push, they also spent several million dollars during the same period on both print and television advertising.

Given Commodore's past practice of maintaining close liasions between national offices, and the natural intra-corporate movement of personnel, you may very well see some of Commodore Canada's creative marketing ideas soon being adopted and adapted elsewhere in an effort to expand Amiga sales.

—Ed Bercovitz

John Steiner's

Bug Bytes

With the new year came a few new bugs. As this column is written, I have several reports of bugs related to the Amiga system date functions. Several programs displayed sporadic problems just before and just after January 1, 1989. Most, if not all, of the problems will have been fixed by the time you read this.

RTClock, the utility that comes with an Insider board, developed a problem, and continually reported the correct date as one day earlier than it should. A repaired version of the program has already been posted to the information services.

The **AmigaDOS** Workbench 1.3 **LIST** command developed a problem during the last few days of 1988, and seemed to repair itself on January 1. Commodore has been made aware of the problem, which may again occur if this version is still in use by the end of 1989. Here's hoping that Workbench 1.4 will have long since replaced 1.3.

Progressive Peripherals & Software has a directory utility program called **DirMaster**. It's date stamp also quit working on January 1, 1989. Progressive Peripherals has already fixed the bug, and released an improved DirMaster. They were just about ready to release an upgrade to the program when they discovered the date bug. A repair was made, and the latest upgrade was ready for release. The program now has several new features, including automatic extraction of Zoo files, and support of the newly-added Workbench 1.3 protection bits. The upgrade is available for $10.00 and your original disk.

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Denver, CO 80204
(303) 825-4144

Owners of ***Supra Corporation*** disk drives should contact Supra for the latest release of their hard disk driver. As reported in earlier Bug Bytes columns, they were having problems with the combination of their driver, Workbench 1.3 and Quarterback in some cases. The original 1.3 compatible Supra driver was 5.1, followed shortly thereafter by version 5.2, and just recently by SupraBoot 1.3. Contact Supra for an upgrade if you are having problems. The difficulties in locating the problem must have been enormous considering that not all systems seemed to have the problem. Our local Amiga dealer only sells Supra hard drives, and Quarterback, and he has had no bad experiences with the drives installed using version 5.1. Even so, he was asked to get the latest version of the SupraBoot utility by both Supra and Central Coast software.

Supra Corporation
1133 Commercial Way
Albany, OR 97321
(800) 727-8772

Registered users of *Gold Disk's* **Comic Setter** should have received an updated version of the desktop comic publishing program. Version 1.0A is strictly a bug fix, and repairs an intermittant problem with graphic backgrounds being destroyed at random. This bug, and a work-around, was reported in an earlier Bug Bytes column. The letter enclosed with the upgrade also notes that a problem with the Okimate 20 print drivers was also corrected. There are no feature enhancements included in this release. If you own version 1.0, and sent in your registration card to Gold Disk, you should have received an upgrade. You can call Gold Disk technical support if you have any problems or questions.

Gold Disk
Box 789
Streetsville
Mississauga, Ontario, CN L5M 2C2
(800) 387-8192

Aegis Software is marketing a newly released version of **Draw Plus**. The program, called **Draw 2000**, is only slightly different from the original Draw Plus. Draw Plus has been in need of a few major bug fixes for quite a while, so when I first saw the new version, I checked to see if the bugs I had reported on in an earlier Bug Bytes had been fixed. I was surprised to find at least two problems remain unfixed. In the new version, Amiga-P, the keyboard short cut for Paste still does not work. Another problem with Draw Plus, originally reported in Amazing Computing V. 3.1 over a year ago, is still there. If you have a hard disk, Draw 2000 will not plot when running from the Workbench. You must start Draw 2000 from the CLI before it will plot properly. A local user informed Aegis technical support about these bugs on at least two occasions well over a year ago. This person was also promised, in writing, a new manual when manuals were ready. The original Draw Plus manual was the manual from the Draw program, and a

small addendum. He has never received a new manual, or even been notified that he may request a new manual.

I made a telephone call to Aegis technical support regarding these problems and also reported these bugs. The technical support person "was not aware" that there were problems from Draw Plus that still remain in Draw 2000. He promised to "look into it". He provided me with upgrade information for those users of Draw and Draw Plus. To upgrade from the original Draw to Draw 2000 is $150.00, and the upgrade from Draw Plus to Draw 2000 is $20.00. He also commented that Draw Plus users can request a new manual, if they wish.

The representative then went on to list the improvements made to Draw 2000. The new program can now open drawings on the Workbench screen, if desired. When a drawing is opened on the Workbench, Draw 2000 will use fast RAM if available, conserving precious chip RAM. The new version is also 10% faster, according to the representative, and includes a version that supports the 68881 coprocessor for a further increase in speed.

I asked the representative why the program name changed, implying a new program, rather than an upgrade to a previous release. His reply was that the change in name was required for legal reasons due to a competing product on another computer.

Aegis Development
2210 Wilshire Blvd.,Suite 277
Santa Monica, CA 90403
(800) 345-9871

Mindware International has announced that owners of **PageFlipper Plus F/X** and **PageRender 3D** can take advantage of instant product upgrades via their newly installed electronic BBS system. The telephone number for their technical support BBS is (705) 7375017. Voice technical support is still available at their technical support hotline.

Mindware International
33 Alliance Blvd Unit 1
Barrie, Ontario, Canada L4M 5K2
(705) 737-5998

Correspondence

In the Correspondence from Readers department, Mark Forman of North Plainfield, NJ, writes of a problem with Deluxe Video 1.2 and Microbotics Starboard II. There was no problem with Deluxe Video until the installation of the memory on his Amiga 1000. Since installing the memory, neither Deluxe Video, nor the Deluxe Video player program work properly. Videos will not play from either ram or from a disk file. Mark wonders if anyone else has had a similar problem with either Deluxe Video, or the Microbotics memory.

In the December issue, I reported that Aegis VideoTitler has a bug which prevents it from working properly on a hard drive. Aegis technical support personnel suggested that running the program from the CLI would solve the problem. Joyce Burek of Houston, TX has written to advise of a simple solution. The icon for Videotitler invokes a file called Videotitler. This file is a script file which can easily be edited in ED or your favorite text editor. The file lists ten paths that need to be modified to match your hard drive destination paths. It is also possible to change the default fonts the program uses.

You must also change the default tool in the Videotitler.info file by single clicking it and choosing info from the Workbench menu bar. Click in the tool types gadget and add your complete hard drive path. Here you will see that the tool is called Titler and this is the actual program which the icon invokes after setting the parameters in the script file.

The same procedure must be done with the VideoSeg file and its info file.

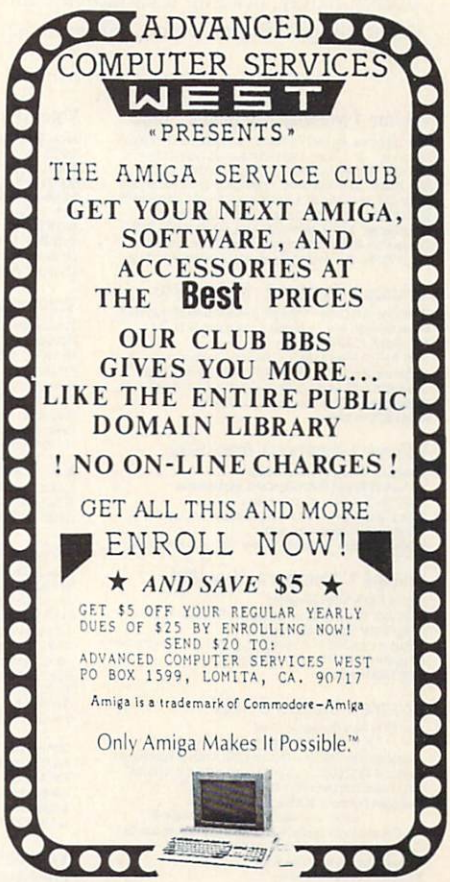
Joyce goes on to report that several things can be done when a program fails to install properly on a hard drive. First, check the info file from Workbench for default tools. Often adding the hard drive path is all that is needed to get the program to work. Next check the startup-sequence on the program disk. Sometimes assignments are made using the Assign command, and they need to be added to your own startup sequence. If the file invoked by the icon is small, and there is a large program file, check the small file in an editor. You may find there is information regarding program loading that may be modified to fit your hard disk configuration.

That's all for this month. If you have any workarounds or bugs to report, or if you know of any upgrades to commercial software, you may notify me by writing to:

John Steiner
c/o Amazing Computing
Box 869
Fall River, MA 02722

...or leave EMail to
Publisher on People Link
or 73075,1735 on CompuServe

•AC•



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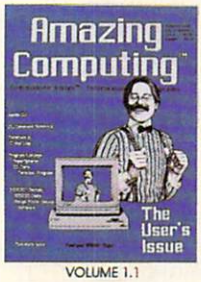
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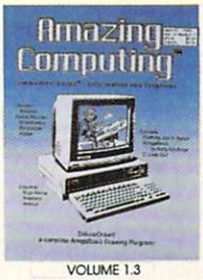
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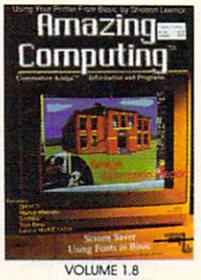
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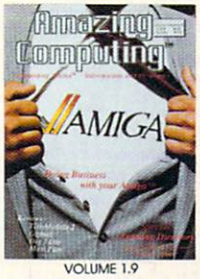
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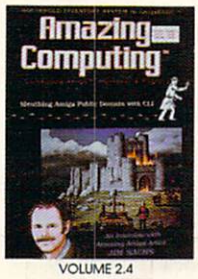
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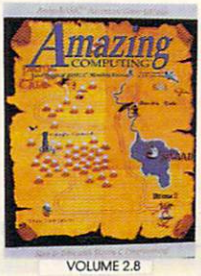
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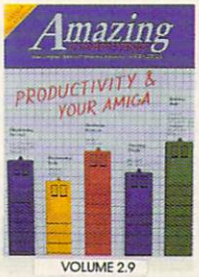
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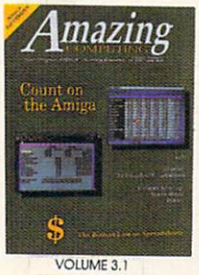
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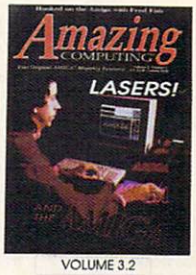
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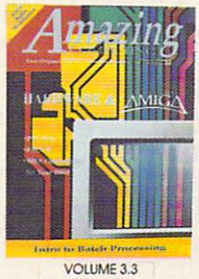
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Roll those Presses *with a review of...*

AmigaTeX

Typesetting Language

by Barney Schwartz

This month we will examine the AmigaTeX port of the TeX (pronounced tech) typesetting language, by Radical Eye Software. Radical Eye, in particular Tomas Rokicki, has done a wonderful job of providing the Amiga community with a high-end, embedded-code, professional publishing program.

In past columns, we have explored WYSIWYG (occasionally referred to as, "What you see is all you've got") desktop publishers. WYSIWYG publishers are also, at times, called visual design packages. AmigaTeX is a typesetting language, and therefore may be described as a logical design desktop publishing package. I say this because the user will spend time in a logical thought process.

Why do I refer to AmigaTeX as a logical design desktop publishing package? Because the command set in AmigaTeX is logical. The Amiga, being a computer, is a logical device. And for a document to be read easily, its visual structure must reflect its logical structure. As you write your document, you should be concerned with its logical structure, not its visual appearance. AmigaTeX allows you to concentrate on the logical structure, thus improving the quality of your writing.

So, what comes in the box, and what does not? When you first receive AmigaTeX, you may be startled by its lack of glitter. My copy came in a bubble-packed mailing pouch. Inside you will find a loose-leaf, three-ring binder which contains program documentation and at least 10— that's right 10—floppies. I say at least ten because the number of disks containing your requested printer driver is depends on the type of printer you own. I have a laser printer and a dot-matrix. The laser printer driver comprises eight disks, while the dot-matrix driver is on six disks.

The package contains four program disks. The first disk, TeX:, contains font metric files, some sample inputs, the plain format file, a font caching file, and a utility to allow you to use a 512K Amiga. The second disk, TeXfiles:, contains the format file for a 512K Amiga, bibtex, initex, preview, utilities to allow for the import of fonts, TeX, the text of the manual, and a few more example files. The third and fourth disks contain AMSteX, SliTeX, and LaTeX plus samples of these, document files, and style files required for these ancillary programs. Disks 5 through 10 contain fonts for use by the previewer.

The three-ring binder contains detailed information about the program package. Mr. Rokicki leads you through installation on any Amiga, and fully explains the use of RAM: and a hard disk. He gives complete instructions for his previewer. You will find information on the use of LaTeX, SliTeX, IniTeX, BibTeX and AMSTeX. The ARexx interface is fully explained. There is information on importing FONTS: installing printer drivers and guidance for reaching expert advice from Mr. Rokicki or the national TeX users group (c/o American Mathematical Society).

What you won't find inside the package is information on the command set for TeX, LaTeX, AMSTeX, or the like. Instead, you will be directed to purchase a book on each of these languages from your local college bookstore. This is not a bad idea. It is more cost-effective to go out and buy the books rather then pay for having them supplied with the program. But be warned. If you are not familiar with the TeX typesetting language, you will need to purchase The TeX book, by Donald Knuth. Also, plan to buy LaTeX, by Leslie Lamport, if you think you will use LaTeX.

The Programs

Since AmigaTeX is really all about TeX, I'll start my description of TeX by quoting Donald Knuth's The TeX book:

"TeX is a typesetting language intended for the creation of beautiful books—and especially for books that contain a lot of mathematics. By preparing a manuscript in TeX format, you will be telling the computer exactly how the manuscript is to be transformed into pages whose typographic quality is comparable to that of the world's finest printers; yet you won't need to do much more work than would be involved if you were simply typing your manuscript on an ordinary typewriter."

A picture actually may be worth a thousand words. Therefore, I will pause here to show an example of TeX flexing its muscles. Take a glance at figure one!

Well, how did TeX do in showing off its stuff? Not bad for an amateur, eh? Yes, that's correct. I'm not a professional mathematics typesetter. As a matter of

(continued)

Figure One

$$\pi(n) = \sum_{m=2}^{n} \left\lfloor \frac{\phi(k)}{k-1} \right\rfloor$$

$$\Pi_R \begin{bmatrix} a_1, a_2, \ldots, a_M \\ b_1, b_2, \ldots, b_N \end{bmatrix} = \prod_{n=0}^{R} \frac{(1-q^{a_1+n})(1-q^{a_2+n})\ldots(1-q^{a_M+n})}{(1-q^{b_1+n})(1-q^{b_2+n})\ldots(1-q^{b_N+n})}$$

Equation created with AmigaTeX. (Printed with dot matrix printer)

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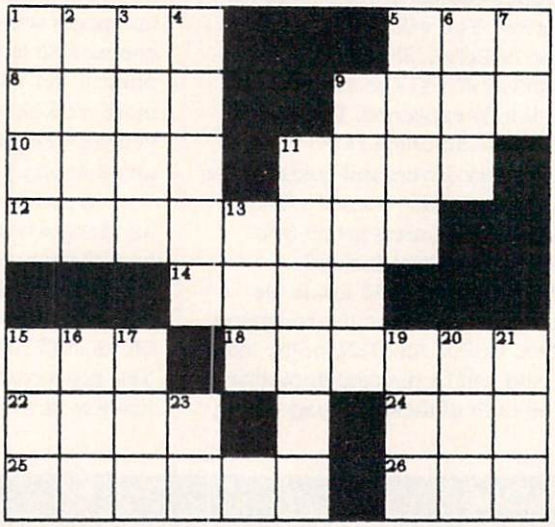
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Figure Two

(Top) *Crossword puzzle craeted with AmigaTeX. (Printed on a dot matrix printer)*

(Bottom) *AmigaTeX code required to produce above crossword puzzle.*



```
{\newdimen\boxsize\boxsize=20pt
\def\b{\vrule width \boxsize}\def\nr{\noalign{\hrule}}\sevenrm
\def\r#1 {\vbox to \boxsize{\hbox{\vphantom{()}\hskip0.8pt #1}\vfil}}
\centerline{\vbox{\halign{\strut\vrule #\hfill\vrule&&#\hfil\vrule\cr\nr
\r1   &\r2   &\r3   &\r4   &\b    &\b    &\b    &\r5   &\r6   &\r7   \cr\nr
\r8   &      &      &      &\b    &\b    &\r9   &      &      &      \cr\nr
\r10  &      &      &      &\b    &\r11  &      &      &      &\b    \cr\nr
\r12  &      &      &      &\r13  &      &      &      &\b    &\b    \cr\nr
\b    &\b    &\b    &\r14  &      &      &      &\b    &\b    &\b    \cr\nr
\r15  &\r16  &\r17  &\b    &\r18  &      &      &\r19  &\r20  &\r21  \cr\nr
\r22  &      &      &\r23  &\b    &      &\b    &\r24  &      &      \cr\nr
\r25  &      &      &      &      &      &\b    &\r26  &      &      \cr\nr}}}
\tenrm
```

fact, I put that little example in just to prove that anyone can use this program and achieve professional results. For another example of the wizardry of AmigaTeX read on.

AmigaTeX is not only a math typesetting language. Although it is true that TeX was not designed to be an outstanding graphics display package, with a little thought, you can use TeX quite well. The examples below show what can be accomplished from within the confines of a text processing, embedded-code typesetter.

Now take a look at figure two! Again, not too shabby for an amateur hacker. Also notice the code required to do the crossword puzzle.

I seem to have strayed from my description of TeX which I will correct right now TeX is a logical typesetting language. If you believe Mr. Knuth's every word, TeX is composed of about 900 control sequences, 300 of which can be considered primitives. Primitives are the low-level atomic operations that are not decomposable into simpler functions. All other control sequences are made up of these 300 primitives. But you can define (\def) any additional sequences which you may require. All of the primitives and other control sequences of TeX are listed in the index of The TeX book. Again, if you don't own it, GET IT. For even if you think you know all there is to know about TeX, you shall no doubt find something you MUST do that you could accomplish if you only had the book. After all, running TeX with its 900 control sequences by rote is NOT like running "C".

Tomas Rokicki, of Radical Eye, has simplified the process a great deal with the inclusion of InitTeX. This program allows users to tailor the format (\ .FMT) file to suit their particular needs. This will speed the parsing and processing of (Plain .fmt)— which contains all 900 definitions— by stripping anything the writer does not usually need, thus streamlining all phases of processing. This is not to say that AmigaTeX is slow, but why waste time looking through formats which are not required for the job at hand?

Not only has Mr. Rokicki provided us with a "C" translation of TeX and a means to modify the format files, he has also included a full implementation of LATeX. LATeX, by Leslie Lamport, is a document design tool. In its creator's words:

"The LATeX document preparation system is a special version of Donald Knuth's TeX program. TeX is a sophisticated program designed to produce high-quality typesetting, especially for mathematical text. LATeX adds to TeX a collection of commands that simplify typesetting by letting the user concentrate on the structure of the text rather than on formatting commands. In turning TeX into LATeX, I have tried to convert a highly-tuned racing machine into a comfortable family sedan. The family sedan isn't meant to go as fast as a racing car or be as exciting to drive, but it's comfortable and gets you to the grocery store with little fuss. However, the LATeX sedan has all the power and features of TeX hidden under its hood, and the more adventurous driver can do everything with it that can be done with TeX. "

What separates LATeX from TeX are all the built-in style macros. These macros, known in TeX as definitions, allow you to create many different styles of documents by simply adding a few DEF calls to your text file.

A few of the styles included from Radical Eye are: Article, Book, Report, Letter and Thesis. These styles let you simply type your document after adding a first line which reads: \documentstyle. LATeX takes care of all the rest. It will make paragraph numbers bold, add footnotes in the proper type and size, insert return addresses, align double column text, compose titles and indices, and take care of other mundane chores, freeing you to concentrate on your thoughts while the program constructs perfect pages.

Well, almost perfect pages. You must realize by now that publishing a printed page is not quite SIMPLE. If you are going to use LATeX, then you will, at first, learn to be satisfied with the default values set within lplain.FMT, the LATeX equivalent of plain.FMT in TeX. These default values set a one inch margin around your document. **The default values FIX line and paragraph vertical spacing, and numerous other complicated measurements which you may be thankful for.** You may choose to change these values. If you do, you must modify the .FMT much as you would working within TeX.

It's break time again. So, take a gander at this little ditty (See figure three)

(continued)



Figure Three

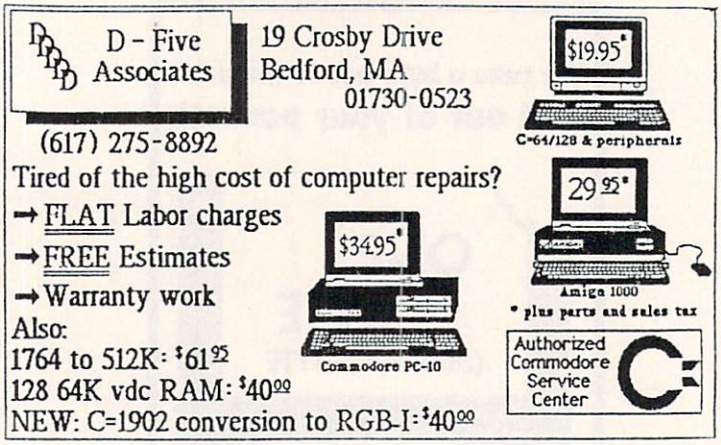
AT&T Common Stock		
Year	Price	Dividend
1971	41–54	$2.60
2	41–54	2.70
3	46–55	2.87
4	40–53	3.24
5	45–52	3.40
6	51–59	.95*

* (first quarter only)

(Top) *Chart craeted with AmigaTeX. Printed on a dot matrix printer)*

(Bottom) *AmigaTeX code required to produce above chart.*

```
\centerline{\vbox{\tabskip=0pt \offinterlineskip
\def\tablerule{\noalign{\hrule}}
\halign to 200pt{\strut#& \vrule#\tabskip=1em plus2em&
\hfil#& \vrule#& \hfil#\hfil& \vrule#&
\hfil#& \vrule#\tabskip=0pt\cr\tablerule
&&\multispan5\hfil AT\&T Common Stock\hfil&\cr\tablerule
&&\omit\hidewidth Year\hidewidth&&
\omit\hidewidth Price\hidewidth&&
\omit\hidewidth Dividend\hidewidth&\cr\tablerule
&&1971&&41-54&&\$2.60&\cr\tablerule
&&   2&&41-54&&2.70&\cr\tablerule
&&   3&&46-55&&2.87&\cr\tablerule
&&   4&&40-53&&3.24&\cr\tablerule
&&   5&&45-52&&3.40&\cr\tablerule
&&   6&&51-59&&.95\rlap*&\cr\tablerule \noalign{\smallskip}
&\multispan7* (first quarter only)\hfil\cr}}}
```



Not a difficult code at all if you consider the quality of the end result. The above code is straight out of The TeX book. It is the classic example from Michael Lesk of Bell Laboratories. This is just another example of the ease with which you can produce beautifully typeset documents with AmigaTeX form Radical Eye.

The package also includes SliTeX, a slide making program, and BiBTeX, a program for automating bibliographies. There are also utilities to import fonts and to automate an index, all of which are no more difficult to master than TeX.

As previously mentioned, Amiga TeX is not a WYSIWYG program. However, this does not mean that you must waste time and money printing your document to proof your work. For this, Radical Eye has provided a \bf Preview utility, which allows you to see each page, in its finished form, on your CRT. You may choose from any of 15 screen resolutions, and switch between two different magnifications, which are selectable during preview operation. You see the actual page exactly as it will print. This means all fonts, justification, margins, columns, line-spacing, and any graphic created with TeX code appears on screen. The equation, crossword puzzle, and AT&T table used in this article were screen grabs from preview which converted to Deluxe Paint brushes.

Exciting News!!!!

For all of you who wish you could use AmigaTeX quality fonts in your WYSIWYG desktop publisher, NOW YOU CAN!!! Pick up Fred Fish disk 135, which contains Ali Ozer's TeXF conversion utility. Fred had to compress the files with ZOO, so if you don't already own FF 108, pick it up. TeXF is an automated, well documented program which will convert any AmigaTeX font into an Amiga screen font. However, there is a bug on the Fish disk. On Fred Fish 135 you will find a file named TeXF.pkfontfiles. This file will direct TeXF to look in the pkfont directory for the font you wish to convert. The correct directory to search is the (pk) directory. Thus, you can either rename all of your (pk) directories as pkfonts (this doesn't make much sense), or you can change each occurence of pkfonts in the file TeXF.pkfontfiles to (pk) (a much more reasonable solution).

Examples of the Amiga screen fonts built by TeXF are accessed via icons on the disk. They look just like the fonts you see in the screen grab off the AmigaTeX previewer. The resulting fonts may be used in any program which uses Amiga bit-mapped fonts. I have successfully used these fonts in Shakespeare, Professional Page, PageSetter, City Desk, Deluxe Paint II and Express Paint.

One thing to remember is that each font created with TeXF has only one size. If you need multiple sizes, you must go to each different size (pk) directory and convert the font. It is much more efficient to do a size range in one sitting. This way, the . (dot) font file for the created font will contain all the sizes you made. If you don't do all sizes in one sitting, you will need to run fontfixer against the .font file to correct the available sizes.

More Exciting News !!!

Radical Eye has ported METAFONT to the Amiga. METAFONT is to type design what TeX is to document design. METAFONT uses mathematical equations and geometric laws to design characters. You may never have a use for this program if you are satisfied with the 1500 fonts provided with AmigaTeX. However, if you need more than the computer modern fonts, you will appreciate METAFONT.

Again, as is true for AmigaTeX, METAFONT requires that you learn a language. The program is not WYSIWYG. It would be extremely difficult to supply a WYSIWYG program with all the facilities of METAFONT. Radical Eye does supply a utility which allows real time viewing of each character as it is created. Tomas has also improved AmigaTeX so that it will automatically create any fonts defined within METAFONT and install these fonts while using AmigaTeX. This process requires a minimum of two MEG RAM, a hard disk, and 15 minutes to create each font. Fifteen minutes!!! How would you like to try to create a whole series of letters, numbers, and symbols with any other program available in less than 15 minutes?

There's more. Radical Eye has made AmigaTeX compatible with the LazerXpress. With the availability of Express Paint 3.0, it is at long last possible to create images in a paint program and text with a document processor, then MERGE THEM TOGETHER IN A VIRTUAL PAGE. The document can be previewed on screen (if desired) and printed to a LazerXpress. Radical Eye is hard at work on graphics merge for AmigaTeX. I don't know all the details at this time but, rest assured, I will keep you informed.

Til next month, keep those cards and letters coming. Remember, this column really is for you - the users of Amigas and readers of Amazing Computing.

AmigaTeX ***$200***

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MicroWay's flickerFixer

One solution to the Amiga's Hi-Res flicker problem.

by Steven L. Bender
President, The National Amiga Users Group

Since 1982, MicroWay has been known for its high quality, American-made, microcomputer add-in products. The company manufactures several CPU accelerator boards, and a PAL programmer for the IBM PC and AT's, and boasts quality products, technical support, and service. After contacting their tech support, I tend to agree.

MicroWay's first Amiga product is called The flickerFixer Advanced Graphics Adapter. Priced at $595, flickerFixer is designed to resolve the problems associated with "flicker" when using the HiRes (640 x 400) Amiga video mode.

There are primarily two other solutions to the Amiga HiRes flicker problem, the less expensive is placing a contrast-reducing, smoked plastic plate in front of the monitor. This plate tends to uncolor colors, thus reducing contrast. With less contrast, the eye perceives less of everything, including flicker. It's easier and cheaper to just turn the contrast control down!

The second solution involves using a monitor with a Long Persistence CRT, an expensive method with additional drawbacks as well. One such drawback is that the video images fade too slowly, resulting in streaking. Another "real world" drawback is the possibility of burning an image onto the phosphor surface, causing the image to remain permanently.

The flickerFixer is a replacement graphics adapter board that fits into the Amiga A2000's video slot and provides its own Analog Video signal to a multiple frequency scanning monitor, or an analog VGA monitor. The flickerFixer outputs a de-interlaced video signal with a 31.5 KHz horizontal scan frequency. Unfortunately, this video signal doesn't function with an Amiga-compatible genlock, or other devices which require the original Amiga video's 15.75 KHz composite sync.

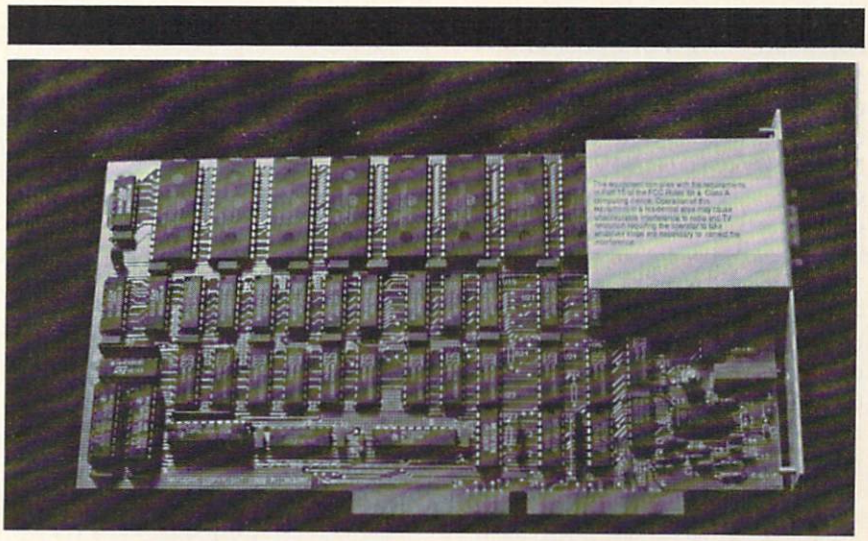
The flickerFixer board receives its display information directly from the I/O of the coprocessor chips. Theoretically, this signal is perfect. Indeed, flickerFixer does an exemplary job of procressing the signal into video: The video signal the flickerFixer produces is higher resolution and, from a video standpoint, superior to the video signal produced by the Amiga's video circuits.

How does it work? In the Amiga 640 x 200 non-interlaced default video mode, the 200 display lines make up the screen. Using the flickerFixer, these 200-line frames are doubled and displayed, with each line sent twice, producing an enhanced 400 line video frame. Therefore, everything on the screen appears to be in 640 x 400 HiRes mode.

In the HiRes Interlaced mode, the board first takes in the "odd-numbered" (1, 3, 5...395, 397, 399) lines, the first frame, and then the "even-numbered" lines (2, 4, 6...396, 398, 400) direct from the Denise Video CoProcessor. Both sets of lines are stored in fast video (static) RAM. Then flickerFixer de-interlaces these frames, and outputs the 400 lines (1, 2, 3, 4...397, 398, 399, 400) as a single video frame. This is sent to the monitor at twice the Amiga's horizontal scan rate, and at a 60 frames-per-second refresh rate.

This double-sided PC board uses a Ground-Plane Technology on both sides, and it is well designed and bypassed. The circuitry includes 48 IC chips, an Intech RGB DAC, nine expensive high speed static RAM memory chips, a PLL (Phase Lock Loop), three fast custom programmed 16R4 PAL chips, and an additional thirty-four 74HC and 74F high speed TTL logic chips. The sample board that was tested carried an FCC Class A sticker, but no FCC ID number. MicroWay later said that the flickerFixer was certified FCC Class B in May, 1988.

(continued)



The video from the MicroWay board is quite independent of the video signal coming from the rear of the A-2000. Both its enhanced video and that video from the Amiga's 23 pin video connector can be used simultaneously, to give you flicker-free, high-resolution video, and use of a genlock using two different monitors. The flickerFixer board was tested in an A-2000, using a Thomson 4375M UltraScan monitor.

The installation and tests

Installation was simple. After taking out five screws, I removed the cover on the A2000, and the video slot panel in the rear. Then I inserted the board into the video slot on the right side of the Amiga power supply. Total time expended: about two minutes. No video cable was supplied with the flickerFixer, but the brief owner's manual (11 pages) provided the pin-out of the DB-9 video connector, and complete specifications.

Incidentally, the video output from the flickerFixer is not usable with the following monitors: Commodore 1802, 1901, A-1080, A-1084, or 2002. A suitable monitor must be able to lock onto the 31.5 KHz horizontal scan frequency, process Analog RGB video, and use separate Horizontal Sync and Vertical Sync signals. The MicroWay owner's manual states that the NEC Multisync and Multisync II (tm) monitors come with video cables that can be used without alteration.

Unfortunately, it seems that almost every other manufacturer of a Multiscan type monitor uses a different cable connector/cable pinout configuration. Using the information provided, it was simple to design the proper cable. As noted in my review of MultiScan Monitors, Part I for *Amazing Computing*, the Thomson UltraScan uses a DB-25 connector for its Analog video input, so a Male DB-9 to Male DB-25 cable was constructed. The following cable configuration was used during these tests (see figure one.)

Next, the Amiga A-2000 and Thomson UltraScan were both turned on. Perfection! Other than centering the display on the screen, (using the controls on the monitor), no additional adjustments were necessary. There is a precision 15 turn (trimpot control)

Figure One: Cable Configurations

Mitsubishi Diamond Scan/Thomson UltraScan: Set for Analog Scan

```
flickerFixer DB-9M Pin:   1   2   3      4       5     6, 7, 8, 9
                          |   |   |      |       |     | | | |
          The signals:    R   G   B   H SYNC  V SYNC     GND
                          |   |   |      |       |     | | | |
   Thomson DB-25M Pin:    2   4   14     16      17    1, 3, 5, 25


                                                   6, 7, 8, 9
MicroWay also provided an alternate Ground pinout:      | | |  |
either cable configuration should work properly.         GND
                                                        | | |  |
                                                      3, 5, 15, 1
```

If the Magnavox Multimode, Logitech AutoSync, or VGA monitor had been used, a different cable configuration would be necessary. Here are cable pinouts (not tested) for other popular monitors:

Magnavox Multimode cable: Set for Analog Mode

```
flickerFixer DB-9M Pin:    1   2   3      4       5     6, 7, 8, 9
                           |   |   |      |       |     | | | |
          The signals:     R   G   B   H SYNC  V SYNC     GND
                           |   |   |      |       |     | | | |
  Multi-Mode DB-9F Pin:    3   4   5      8       9     1,1,1,1


                                                    6, 7, 8, 9
MicroWay also provided an alternate Ground pinout:       | | | |
either cable configuration should work properly.          GND
                                                         | | | |
                                                       1, 1, 6, 7
```

Logitech AutoSync cable: Set for Analog Mode and Manual Scan

```
flickerFixer DB-9M Pin:    1   2   3      4       5     6, 7, 8, 9
                           |   |   |      |       |     | | | |
          The signals:     R   G   B   H SYNC  V SYNC     GND
                           |   |   |      |       |     | | | |
    AutoSync DB-9M Pin     1   2   3      4       5     6, 7, 8, 9
```

The information in the Logitech AutoSync User's Manual on page 25: Pin Assignments Required for Analog Operation, under the leftmost heading Separate Sync shows pin #5 is connected to Ground. This is an ERROR; do that and you could damage your flickerFixer board. Pin #5 is the Vertical Sync line.

VGA Monitor cable:

```
flickerFixer DB-9M Pin:    1   2   3      4       5     6, 7, 8, 9
                           |   |   |      |       |     | | | |
          The signals:     R   G   B   H SYNC  V SYNC     GND
                           |   |   |      |       |     | | | |
VGA Monitor DB-15M Pin:    1   2   3      13      14    5, 6, 7, 8


                                                    6, 7, 8, 9
MicroWay also provided an alternate Ground pinout:       | | | |
either cable configuration should work properly.          GND
                                                         | | | |
                                                     6, 7, 8, 5 & 10
```

phasing adjustment on the flickerFixer board, just in case the resulting display is not stable. An alignment tool is provided with the board. We did not need to adjust the control, however. From this point on, everything is displayed in an enhanced 640 x 400 mode, including the Workbench screen, Preferences, games, etc.

Just what can you say about the resulting display from the flickerFixer? Well, the dark between scan lines that breaks up the default Amiga display was gone. It looks like a high-resolution display, with no individual scan lines visible. Otherwise, it looks and acts like a normal Amiga display. I quickly noticed there was less visual fatigue, and more pleasure in watching the "enhanced" video. Perhaps it was an optical illusion, but it looked as though there was more overall definition to each screen. Someone else mentioned more saturation to the display colors. A bonus is that this board works with **all software** and, for all intents and purposes, is **totally transparent** to the user!

Is it really perfect? No. The resulting image is slightly less than full CRT screen size, at least on the Thomson UltraScan. In the case of the Thomson UltraScan, the rear-mounted Underscan/ Overscan switch had absolutely no effect in analog mode. Using the rear-mounted Horizontal and Vertical size controls on the monitor, the screen was adjusted for the maximum size. This still left about a 1/2 inch black border on the left and right sides of the Workbench screen, and a 1/4 inch black border on the top and bottom of the screen. This is a minor point, and it occurs using the default 640 x 400 mode. It could be better, or worse, on another brand of monitor, depending on the latitude of the screen size adjustment controls.

MicroWay supplied a disk featuring a test pattern, some sample screens, and overscan-mode patches giving resolution of 672 x 460 (for both NTSC and PAL). The documentation states that when these overscan modes are invoked, Preferences must be used to shift the Workbench Screen significantly upward, and all the way to the left. Using the appropriate overscan patch probably allows for better use of the entire CRT screen. For evaluation, I decided to use the default 640 x 400 mode.

The flickerFixer's video comes out in 1/60th second frames. Therefore, when using flickerFixer, almost everything looks quite "normal", just in HiRes, as it should. While the video is quite fast on some games, there might be problems due to the speed and the de-interlacing effect. Medium speed games like Marble Madness and SideWinder, which have continuous animation, look good. The rapidly firing missiles of SideWinder look normal, but they tend to travel in a straight vertical direction, so it is hard to see if anything is amiss.

However with faster games, like Arkanoid, things might get a bit confusing to watch. high-speed Video Sprites may produce a doubled image since such Sprites can move almost instantly. A mundane example would be moving the mouse pointer rapidly. The result is a slightly doubled image. This effect isn't that bad compared to the "trailing ghosts" seen on a long persistence monitor. The Sprite problem is seen most when rapidly moving objects perambulate at sharp angles across on the screen.

The flickerFixer makes Amiga look like the color Mac II™ with its fast, dual mode Video RAM, 640 x 480 resolution, and 68020 CPU. The flickerFixer on Amiga looks and acts similarly. Can one ever go back to the "normal" Amiga default 640 x 200 mode after living with the flickerFixer? I think anyone who sees this combination in action would never accept the Amiga A-2000 default mode again. If you are currently planning on getting an A-2000 or an A-2500, get a multiple frequency scanning monitor so you can upgrade to flickerFixer in the future. If you already have an A-2000 and you have a multiple frequency scanning monitor, get the flickerFixer. It's that good.

Postscipt

Recently, there has been much ado about the so-called Enhanced Denise Chip for Amiga. These retrofit chips will simply drop into the A-2000, and will probably be standard on the A-2500 and the A-3000. The revised and enhanced chip is an attempt to solve some of the "problems" we now associate with the HiRes video mode. Preliminary information suggests that:

1. The application software will have to be revised (rewritten) to utilize the new features of the Enhanced Denise Chip.

2. When utilizing the new features, your Amiga 640 x 400 HiRes mode will be limited to 4 colors from a palette of 64.

3. The video coming from the Amiga will not be improved from a video standpoint. This information about the limited color capability, etc., is unconfirmed at this time, but it came from a knowledgeable industry source.

It is likely that the flickerFixer board will remain a viable option for those users who want the best video signal and would rather spend their money on the graphics board/monitor while retaining their old software instead of upgrading dozens of software packages just to use the new enhanced Denise Chip.

Special thanks to Ayube Beg for allowing his A-2000 and Thomson UltraScan to be used for evaluation purposes.

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•AC•

Roomers

& Replies

by The Bandito

[The statements and projections presented in "Roomers" are rumors in the purest sense. The bits of information are gathered by a third party source from whispers inside the industry. At press time, they remain unconfirmed and are printed for entertainment value only. Accordingly, the staff and associates of Amazing Computing™ *cannot be held responsible for the reports made in this column.]*

On the technology front, informants say that magneto-optical disks are heading your way. By the summer of 1989, manufacturers should have a 3.5", 20 meg SCSI device with a removable disk for the price of a 20 meg hard drive. The access time should be about the same as standard 20 meg hard drives, and disks will cost about $10.

More evidence of falling DRAM prices: IBM has stopped buying them, and is relying on their own production. Since IBM accounts for 10% of the DRAM market all by themselves, this means more chips will be available for everybody, and the prices will go down. IBM produces its own DRAMs, and word is they've gotten their yields up to the point where they can fill their own needs. Maybe this is the year that everybody ends up with 9 megabyte Amigas.

Is anybody ever going to write X-10 control software for the Amiga? The X-10 modules are those handy little devices that control your lamps, coffee maker, etc. There's software for the Mac, the C64, and the IBM — why not for the Amiga? Work on it. The Bandito wants to call Ami from the office and have dinner ready by the time the car pulls into the driveway.

Amiga software is now sold in Software Etc and Babbages. The selection is limited so far, but reports say it's doing well. Next target for Commodore: Egghead Discount Software, which is growing by leaps and bounds. Selling Amiga software in Egghead will help make the Amiga a recognized competitor, a true alternative to Apple and IBM in the minds of the public. Maybe then we'll see more newspaper stories about the Amiga.

WordPerfect Corporation is said to be so taken with the Amiga that they're going to develop WordPerfect 6.0 on the Amiga first, then port it to other computers. Apparently, they like the development environment and have some really snappy development tools created for the Amiga. Look for WordPerfect 5.0 on the Amiga to be released this fall.

The Bandito hears many things over the vast electronic network that connects computers around the globe. One area where the public is kept in the dark concerns the money programmers earn. The popular impression is of wealthy nerds driving around in Ferraris, occasionally sending off some code through their cellular phones. In reality, only a lucky few attain that level. Programmers get anywhere up to 15% of the software's wholesale price in royalties. On average, the wholesale price is about half of the retail price. When you consider that a hit game on the Amiga sells about 20,000 copies in maybe two years, this doesn't add up to much. Most games sell around 10,000 copies or so, and most programmers get less than 15% of that. If the programmer works for the company, he gets no royalties at all. You can see why, to make real bucks, programmers need to come out with versions of the product for other computers (an average IBM title will do 50,000 copies). The interesting thing to note is that Amiga game sales are way above IBM game sales when you consider sales per unit: there are 12 million IBMs to 800,000 Amigas. This bodes well for the future—if Commodore can get Amiga units into the 2 million territory, then we're looking at quite respectable game sales.

It looks like 1989 might be the year the Amiga really takes off. Commodore is getting very serious about putting the A500 into mass distribution. So far, the current dealer network hasn't screamed about the idea; they're happy to sell A2000's which give them a greater profit, anyway. And the mass market chains are getting nervous about the future of Nintendo, sensing that the big bust is going to happen this year. Commodore hopes to pick up the pieces with the A500. (Hey, kid! Check out the games on this machine!) Look for some test-marketing this spring, with a big push in the summer building up to (hopefully) whopping orders for Christmas.

As to what this will do to the C64 and the Colt, no one's too sure yet. The C64 may mutate into a low-cost game machine, like the Atari 65XE did. This Christmas should prove very interesting in the entertainment hardware market.

Epyx is up to something really big, and the rumors are buzzing around them like flies on sugar. Most of the speculation centers around the expert Amigans they've gathered into their ranks —RJ Mical, Dave Needle, Dave Morse, and now Jude from Mimetics, designer of the AmiGen genlock. And they may hire more Amiga people in the future.

No one's talking about the sneak previews of their gear at CES, so the Bandito can only offer speculation. Is CD-ROM a part of the grand design? It seems like a good bet since Nintendo, Sega, and Atari all have CD-ROM players in the works to go with their next-generation video games. Epyx is trying to leapfrog the technology and beat those people with killer graphics and sound. Stay tuned to this space for more data as the Bandito gleans stray bits from the ether.

Epyx, joining most of the other big software companies, also had a few Christmas layoffs. The Bandito hears that Xmas results were actually quite good at some of the software giants, in spite of (or is it because of?) the talk of poor sales potential and the layoffs. It's hard to figure these layoffs sometimes, but in general they have a good effect — it's a chance to get rid of some of the people who didn't work out too well, but you never had enough guts to fire.

When Epyx was contacted for comment, a representative of Epyx agreed that 8 employees out of a company total of 145 were released. Although the year end sales were very good, the figures were not as high as Epyx had originally planned. Epyx management feels a responsibility to their employees and the eight individuals are receiving placement assistance by Epyx in securing other positions. ED.

Sometimes not all personnel adjustments are layoffs — people sometimes leave of their own accord. In this vein, the Bandito hears that Cinemaware has lost several programmers—going freelance for greener pastures (emphasis on the green). At the same time, Cinemaware is trying to persuade smaller software publishers to become affiliated labels, meaning that Cinemaware would be their exclusive distributor.

AC contacted Bob Jabobs of Cinemaware for comment. Mr. Jacobs told AC that the three programmers in question were IBM PC programmers, not Amiga programmers. According to Mr. Jacobs, most, if not all, of the software created by Cinemaware is first produced on the Amiga. Since they have developed a great deal of original programming libraries, Cinemaware can then transport the code to other machines. The PC programmer's exits were caused in part by their secondary status in an Amiga based shop.

Mr. Jacobs went on to say there is a great deal of money to be made by translating software to and from the Japanese market. The figures drive a few programmers out on their own. The risk to job security is small compared to the advantages and possible gains of being one's own boss.

Regarding Cinemaware's plan to provide publishing and distribution services to smaller software publications through an affiliated label program, Mr. Jacobs said that such a service was needed. The smaller companies will benefit from the increased exposure provided by Cinemaware. And Cinemaware, even with its specialized software, can only produce four titles a year. With the addition of an affiliated label and several new publishers, Cinemaware can now greatly increase the number of product introductions. These programs will be published under a separate label, not to be confused with Cinemaware

HAM Paint Wars: It looks like March is the month for hostilities to resume. Around that time you'll see PhotonPaint II arrive at Digi-Paint II, ready to battle it out. PhotonPaint beta testers say that it adds extra swap screens among other features, and the price is now $150. Digi-Paint II has a snappy new interface and some powerful image-processing features, and they've added text capabilities with anti-aliasing. Just to complicate matters, DeluxePaint III makes its debut in March. While the program still doesn't use HAM mode, it does have a whizzy set of animation tools that will make it a must-have. Express Paint 3.0 will also be entering the fray, with some innovative text-handling features and powerful paint functions. There's plenty of choices, that's for sure.

While software manufacturers skirmish over paint programs, Nintendo is waging nuclear war with Atari Games. Stung by Atari Games producing non-licensed Nintendo-compatible cartridges and their $35 million dollar lawsuit, Nintendo has lobbed a legal ICBM back at Sunnyvale. Nintendo is now suing Atari Games for illegally producing Nintendo cartridges, in violation of Nintendo's patents, copyrights, trademarks, etc. To make things really interesting, Nintendo has charged Atari games with violation of the RICO act, charging racketeering and corruption. The RICO act is usually used by the Feds to prosecute drug lords and Mafia kingpins. Is Nintendo making a statement about the addictive nature of video games?

Latest data from Commodore indicates that Joel Shusterman was fired, perhaps because of negative reaction to those Amiga MTV commercials, according to Deep C. In other interesting data: Griffin-Bacall, Commodore's ad agency, has become Commodore's former ad agency. The official party line is that G-B just landed the entire Sharp account, and since Sharp makes computers (among other things) that would be a conflict of interest. Darker speculation again hints at Commodore's displeasure over the MTV spots and the generally negative reaction to them by the dealer network. The spots didn't really use the Amiga's graphics to the fullest, to say the least.

Yet another new Amiga virus, once again from Europe. Don't those people have anything better to do? The Bandito's sick and tired of these things, which are stifling the free flow of killer demos. On the bright side, it may take a nibble out of piracy, since this new virus can easily be attached to programs you download from a BBS. (A horrid speculation occurs to the Bandito. Could some game manufacturer, angered at the piracy problem, deliberately create a virus that is set free if you copy one of their games? A blood-freezing idea, but tempting nonetheless...)

The new Amiga models (the A2000HD and the A2500) are moving briskly, and Commodore is ramping up production to meet the demand. While they are nothing really new (you could do the same thing with third-party add-ons months ago) it shows Commodore that a number of power users out there want Amigas with hard disks and 68020's. The 68030 Amiga is still in prototype while Commodore figures out what sort of features to make standard, and what the right price point is. The techies argue for more features, while the marketdroids are trying to keep the price tag out of the stratosphere. They aren't even contemplating a release date yet, according to Deep C. You will be informed as the Bandito hears more juicy bytes of data.

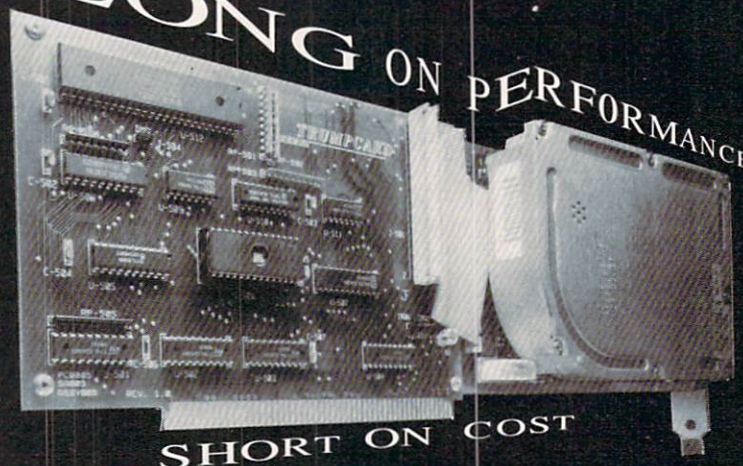
Another flight simulator takes off — this time it's *Falcon* from Spectrum Holobyte, a very nice port of the best-selling Macintosh/IBM title. Unlike many ports, Spectrum Holobyte really took advantage of the Amiga hardware. The Bandito likes it better than *Interceptor*, particularly because there are more combat missions and you can play against other computers over a modem. (Few things are as fun as shooting down planes flown by an Atari ST or an IBM.) Of course, you do miss out on the big thrill of *Interceptor:* bombing EA's corporate headquarters.

There seems to be a trend among game developers to throw out

(continued)

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AmigaDOS and write their own DOS, to get graphics and sound off the disk faster. It started with Jim Sachs and his *20,000 Leagues* disk that would show a picture about two seconds after you stuck it in from the WorkBench prompt. Now almost everybody does it. Compared with the data transfer rates possible with the hardware, AmigaDOS looks like a snail on Quaaludes.

The latest the Bandito hears on this front is that some brainy game developers have figured out how to get more than a megabyte of data on a standard Amiga disk by changing the way the disk is formatted. Mind you, this is all standard Amiga hardware and disks, and that's 1.5 megabytes WITHOUT compression. Hello, Commodore, are you listening? Maybe you should talk to some of these bright boys and get some of their code for the next version of AmigaDOS. Why should games be the only programs that load fast? Shouldn't every Amiga owner get the benefit of megabytes of storage on their disks?

Latest news from the Bandito's worms at Apple: the entire Apple II line, including the fabled IIGS Plus discussed in this space before, is in grave peril. The culprit: the Macintosh. It seems that Mac Plus sales to schools are increasing, and even their sales to the home are getting better. And the manufacturing cost of the Mac Plus is getting very low. Apple could price it at retail for $1000 and still maintain their huge margins. The thinking at Big Red now is that maybe they should just get rid of the Apple II line, which has no great future (the chip architecture is about maxed out). Then they could brainwash eager young buyers into getting Macintoshes, which they'll get hooked on and want bigger and better versions for the rest of their buying lives. A chilling vision of the future, and one that just might come true.

So why isn't Commodore getting the Amiga into the education market? They're trying, but it's an uphill battle. If Apple really does make this switch, it could mean a bit of an opening for Commodore, since the Mac has very little installed base in the schools right now. Whatever happened to the good old days when every school had Commodore PETs?

New Horizons joins the list of other Amiga developers working on Macintosh versions of their products. The lure of added revenue is too great to resist, it seems. They may find that the market is tougher than it looks, however. There are advantages to the smaller Amiga market — the competition is not as sophisticated, for one thing.

Commodore has "deleted" some jobs, mainly among product demonstrators and technical support. (The phrasing comes from Commodore, and it does seem rather peculiar. Why not say "fired"? Perhaps their payroll computer had a head crash, and the jobs actually were deleted: "I'm sorry, but Payroll has no record of you working for us. What did you say your name was?"). On the other hand, the higher-level management positions are being packed with Max Toy's old cronies from Compaq and ITT. Not a bad idea, actually. It might bring some greater professionalism to the company. Many developers just wish they'd keep some of these people long enough so they can get to know them.

•AC•

FULLY Utilizing the Motorola 68881 Math Coprocessor: Part I

TTTTTTTT TURBOCHARGING

the Savage Benchmark

by Read Predmore

Introduction

Although the Amiga models 500, 1000 and 2000 do not come with a math coprocessor or even a socket for a math coprocessor, MicroBotics has put a socket for the Motorola MC68881 floating-point coprocessor on their Multi-Function module which plugs into their Starboard-2 memory expansion unit. They even supply a set of the Amiga Workbench Version 1.3 math libraries which automatically access the MC68881 if it is installed. These libraries and the math coprocessor will significantly improve the speed of double precision calculations.

I have written a set of articles which explain in detail how to program the MC68881 coprocessor chip in assembly language and how to utilize the '881's other seven internal registers not used by the Version 1.3 math libraries. This can give another factor of four (4) increase in speed.

This first article gives an overview of the MC68881 coprocessor chip and then goes through the steps to translate the Savage benchmark into assembly. The next article will do the same for calculations of Mandelbrot and Julia sets while using seven (7) of the '881's internal registers. The article also introduces debugging tools which can be used with the Manx SDB source level debugger to set and view the MC68881 internal floating-point registers. The final article will provide the user interface for the Mandelbrot program and describe how to plot pixels at least ten times faster than the WritePixel() function in the Amiga graphics library.

Background

I obtained one of the first Multi-Function modules which installs in the MicroBotics Starboard-2 memory expansion unit and put in a MC68881 (12 MHz) coprocessor that I bought separately for around $160.00. The current (December 1988) model is the MC68881RC12B and is available from Hamilton/Avnet for around ($130.00). Their telephone number in Massachusetts is (508) 531-7430.

I was first able to utilize the math coprocessor by extensively reworking some beta software that MicroBotics included with the unit. There were some preliminary function calls written by Jim Goodnow of Manx and Dale Luck of Amiga fame. I use the Manx Aztec C compiler, so I rewrote all of the double precision functions in the floating-point library (MX.LIB of V3.4 of the C compiler) to call the MC68881. It worked and multi-tasked, but I'm not sure the average user would want to do what I did.

At that time, MicroBotics was working with Commodore to incorporate the MC68881 function calls into the Amiga math libraries. The initial AmigaDOS 1.3 math libraries only support an '881 which is associated with a M68020; they do not support an '881 on the MicroBotics multi-function module. However, MicroBotics will provide a set of libraries, written by Dale Luck, to replace the existing libraries, as well as two Motorola documents on programming the '881 [Ref. 4 & 5]. This package is sold for $15.00 as the 68881 Developer Package and is available directly from MicroBotics [Ref. 6].

Although these math libraries utilize only one of the MC68881's eight floating-point registers (FP0) , they increase speed by a factor of around 3.5 for double precision multiplications or divisions and a by a factor of around 75 for trigonometric calculations. If you are fortunate to have an Amiga with the 68020/68881 processor/coprocessor, the Manx Aztec C compiler has an option which will utilize four of the '881's internal registers for double-precision register variables. In that case, no assembly language programming would be necessary.

I developed some programs which fully exercise the capabilities of the Motorola MC68881 math coprocessor chip. For example, a stock Amiga 1000 running at 7 MHz, without the '881 chip takes 1223 seconds for the Savage benchmark and 16.1 seconds when using the '881 chip. For comparison, an Apple Mac II runs that benchmark in 5.42 seconds. However, I have reprogrammed the Savage benchmark in assembler to utilize the internal registers of the MC68881, and have obtained a benchmark time of less than 5 seconds, which is faster the Mac II (16 MHz) with a 68881 or a Compaq 386/16 MHz with a 80387 math coprocessor.

The point is not that an Amiga is inherently faster than a Mac II—although the Amiga graphics coprocessors put it in the same league—but during the Savage benchmark or other extensive floating-point calculations, 3/4 of the time is spent sloshing the data back and forth between the 68000 or 68020 CPU and the 68881 FPU (Floating-Point Unit). By using the internal registers of the '881 to store intermediate results most of the time can be saved. The overhead resulting from unnecessary data transfer can be avoided. These techniques are not unique to the Amiga, they apply to any machine with an MC68881 math coprocessor.

(continued)

Overview of MC68881

The following is a summary of the various floating-point formats on the Amiga:

	Precision		Range
Motorola FFP	32-bits	7 digits	5.4e-20 to 9.2e18
IEEE Single	32-bits	7 digits	1.2e-38 to 3.4e38
IEEE Double	64-bits	16 digits	2.2e-308 to 1.8e308
MC68881 Internal	80-bits	19 digits	8.0e-4933 to 6.0e4931

The single and double-precision representations are the IEEE 754 standard formats for floating-point numbers in contrast to the Motorola Fast Floating Point (FFP) numbers, which, although 32-bits, have a completely different format from the IEEE single precision numbers. The MC68881 has eight internal floating-point registers, FP0 to FP7, with each having 80-bits for representing floating-point numbers.

In addition to the floating point numbers, integers of byte, word (16-bit) and long word (32-bits) can be used as variables with the '881. They are converted to a full 80-bit floating point format as they are read into the '881, or converted from 80-bit floating-point to byte, word or long word as they are read out of the '881.

The MC68881 instruction set includes complete set of monadic (single operand) operations for regular trigonometric and hyperbolic trigonometric functions, as well as, logarithmic and exponential functions. A full set of dyadic (dual-operand) functions such as FADD, FSUB, FMUL, FDIV, etc. are also available.

There are three ways a MC68881 chip can be interfaced into a computer system:

1. A 68020/68881 processor/coprocessor pair is fastest since the $F-line MC68881 instructions are intercepted by the 68020 hardware and the instruction is passed to the 68881 without any additional software. The Motorola M68xxx coprocessor instructions all have a hex $F as their high-order nibble and the 68020 has special hardware to handle instructions with a leading $F.

2. Another option when the MC68881 is used without a 68020 is to install a $F-line trap handler in the exception vector table. This adds the overhead of the exception handler to each '881 instruction and can be used to run and/or test code for a 68020/68881 combination on a 68000 machine.

3. The third method, used on the MC68881 installed in the MicroBotics StarBoard-2 Multi-Function board, is to treat the MC68881 as a memory mapped peripheral with ten 16-bit I/O registers and three 32-bit I/O registers. For our applications, only the RESPONSE, COMMAND, CONDITION and OPERAND registers are used. The MC68881.i macro file defines these address offsets with respect to the MC68881's base address. Ref. 5 gives a more detailed discussion for these other variable types and addressing modes.

Floating-Point Benchmarks

I ran two floating-point benchmarks on the Amiga: the first one tested multiplies and divides and the second, the Savage benchmark, tested transcendental functions. The first benchmark runs through a loop 100,000 times. Each loop has 4 multiplies and 4 divides so each benchmark contains a total of 800,000 multiplies and divides. The times in Table 1 were done using the various Amiga libraries, with and without the MC68881. The FFP benchmarks are the fastest and would be the math routines to use if 7 digits of accuracy are sufficient.

Although the double precision routines using the '881 are about twice as slow as the FFP benchmark, they are 3.5 times faster than without the math coprocessor. One curious result in Table 1 is that the double precision calculations take 30% longer when the MT.LIB is linked instead of MA.LIB. I don't know the cause of this discrepancy. The Manx C linker uses the MA.LIB library to include the mathematical functions which will call the mathieeedoubbas.library to do double precision multiplies, divides, etc. The MT.LIB library will call the mathieeedoubtrans.library for transcendental functions such as sine, tangent, etc.

The Savage benchmark only tests transcendental functions so it is somewhat artificial, but it does offer a comparison between computers and various floating-point calculations. The C version of the program is shown in Listings 1 and 2. The results of this benchmark are given in Table 2. Some results from the Byte article [Ref. 1] are given for the Mac II and a Compaq 386/16. Timings for various Amiga math libraries are also shown. The FFP routines exhibit some of the fastest times but have limited accuracy. For 25,000 iterations, with an 86% error, there is no accuracy left. Next, timings are given for double precision calculations using the V1.2 math libraries. A six digit accuracy is obtained, but it takes 20 minutes to do 25,000 iterations. The MicroBotics V1.3 libraries are used for three cases; the Manx Aztec C MA.LIB, MT.LIB and for my '881 assembler version.

Although the MA.LIB and MT.LIB both use the MC68881, the MA.LIB only utilizes it for multiplies, divides, additions, and subtractions, so that the transcendental functions such as the tangent are done using a series of calculations. In contrast, the MT.LIB directly calls the MC68881 to do the square root and tangent calculations with a factor of 20 improvement in speed.

Table One: Multiplication and Division Benchmark Timings

		Number of Loops	Time sec.
Amiga (7 Mhz)			
FFP		100,000	108
V1.2 IEEE math libraries			
Linked with:	MA.LIB 100,000	670	
	MT.LIB 100,000		733
MicroBotics V1.3 IEEE math libraries (68881)			
Linked with:	MA.LIB 100,000	206	
	MT.LIB 100,000		269

Finally, my assembler version obtains another factor of 3.2 increase in speed by using the internal registers. In addition, an increase in accuracy of four orders of magnitude is obtained because of the MC68881's 80-bit internal accuracy and the fact that the variable a was not truncated to 64-bits during each iteration through the loop.

Development of Assembler Version of Savage Benchmark

The first step in speeding up your program is to determine a portion of your code that is heavily dependent on double precision floating-point calculations. In the case of the Savage benchmark, the loop which calculates and increments *a* is an obvious place to start. This loop is separated into a function whose only input parameter is the number of times through the loop. This function, sav_sub(j), is shown in Listing 2. The nested calculation for *a* is broken down into individual steps such as:

```
a *= a;
a = sqrt(a);
```

etc...

Next, utilizing the Manx Aztec C compiler, an assembler version of this code is obtained with the following command line:

```
cc +fi -a -n -t -o sav_sub_881.asm sav_sub.c
```

The compiler options are:

+fi - use IEEE double precision
-a - don't assemble
-n - incorporate SDB debugger options
-t - keep C code in assembler listing as comments
-o - use the following file name as the assembler output file name

(I recommend Ref. 2 for learning M68000 assembly language programming and Ref. 3 once you have learned the basics.)

Converting 68000 assembler into 68881 code

For the Savage benchmark function, two of the '881 internal registers are used:

FP1 - the constant 1.000
FP2 - the variable a

Listing three, sav_sub_881.asm, has the original 68000 code commented out using semi-colons and the new MC68881 code shown in bold print. Just after the _sav_sub label the MC68881.i macro file is included and the SETUP_881 macro is called. The '881 macro file, MC68881.i, is Listing 4 and is discussed in a sidebar. The global constant M68881_BASE is found by the test_881() function from the io68881.library. This base address is used in the SETUP_881 macro. The variable *a* is initialized to 1.00 by storing the ROM constant ONE in FP1 and moving FP1 to FP2. Next, *a* is squared by multiplying FP2 into FP2 with the REGREG fmul,fp2,fp2 macro. The subsequent functions are done by taking the square root, etc. of FP2 and storing the result back in FP2. After the loop is completed, the value for *a* is transferred to D0/D1 as a return value for the sav_sub() function and the SHUTDOWN_881 macro is called before the function returns.

By keeping the variable *a* inside the '881, 75% of the time for this benchmark is saved by not having to transfer data back and forth between the MC68881 and the M68000 each time an arithmetic operation is done.

To be continued next time ...

The next part of this discussion on the '881 math coprocessor will utilize seven of the MC68881's eight internal registers to calculate Mandelbrot and Julia sets with a factor of 5 savings in time. Also some debugging tools which allow the '881 registers to be printed out from within the Manx source level debugger SDB will be discussed.

(continued)

Table Two: Savage Benchmark Timings

Computer		# of Loops	Time sec.	Loops/ sec.	Compiler
Compaq 386 (16 MHz/80387)		25,000	8.95	2,790	(MetaWare)
Mac II (16 MHz/68881)		25,000	5.42	4,610	(Consulair)
		25,000	3.68	6,790	(Manx)
		25,000	3.40	7,350	(MPW)
Amiga (7 Mhz)					Fractional Accuracy
FFP		2,500	10.43		9.1e-02
		25,000	99.70	251	-8.6e-01
V1.2 IEEE math libraries					
Linked with:	MA.LIB	2,500	121.37		-6.1e-9
	MA.LIB	25,000	1223.48	20	-6.1e-7
V1.3 IEEE math libraries (68881)					
Linked with:	MA.LIB	25,000	312.47	80	-6.1e-7
	MT.LIB	25,000	16.05	1,560	-1.1e-10
Assembler		2,500	0.40		-1.1e-15
		25,000	4.92	5,080	3.2e-14*
		250,000	49.15		6.9e-13

*The improved accuracy is due to the 80-bit internal accuracy of the MC68881 math coprocessor as compared to 64-bits for IEEE double precision.

References

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3. M68000 16/32-bit Microprocessor Programmer's Reference Manual, Motorola, Fourth Edition, *Prentice-Hall*, Englewood Cliffs, N.J., 1984.
4. MC68881 Floating-Point Coprocessor User's Manual, *Motorola*, 1985.
5. MC68881 Floating-point Coprocessor as a Peripheral in an M68000 System, *Motorala Application Note.*, 1986.
6. *MicroBotics, Inc.* 811 Alpha Drive, Suite 335, Richardson, Texas 75081. Telephone (214) 437-5330.

Assembler MACROS for the MC68881

The essential features of the MC68881 User's Manual [Ref. 4] and the MC68881 application note [Ref. 5] have been condensed into the seven macros in the MC68881.i file. These macros are described in Tables 2 and 3. Table 2 is a full description of each macro and Table 3 is a quick reference for use when programming. The capability for all arithmetic functions and arithmetic comparison is included. The only restriction is that double precision variables are transferred to and from the '881 and they are moved via the D0/D1 register pair in the M68000. Appendix A of Ref. 5 discusses a full set of data transfer modes such as indirect addressing (AN) for all data types; byte, word, long, single precision floatingcpoint (32 bits), and extended precision floatingcpoint (80 bits stored in 3 long words).

Listing One
SAVAGE.C

```
/*==============================<  SAVAGE.C
>==============================
 *
 *  Transcendental calculation benchmark.
 *
 *  Modified for AMIGA Double Precision and compiled with Aztec C V3.60a
 *
 *  and linked with MA.LIB or MT.LIB to utilize a MC68881.
 *
 *  Copyright (C) 1988, 1989 by Read Predmore
 *
 */

#include   <intuition/intuition.h>
#include   <exec/exec.h>
#include   <exec/libraries.h>
#include   <functions.h>

struct     IntuitionBase *IntuitionBase;

#define    ILOOP     25

double     getime(), sav_sub();
long       atol();
void   *MC68881_BASE;
void    test_881();

/*==============================<  MAIN
>==============================*/
main(argc,argv)
int      argc;
char      *argv[];
{
    long   i, j;
    double a, da;
    double time0, dtime;

    test_881();
    IntuitionBase
        = (struct IntuitionBase *)OpenLibrary("intuition.library", 0L);
    if (IntuitionBase == NULL)
    {   puts("Can't open intuition.library");
        exit(-1);
    }
    j = ILOOP;
    if(argc > 1)
        j = atol(argv[1]);
    else
        printf("Usage: %s <nloops> \n", argv[0]);
    printf("\nStarting %ld loops of SAVAGE benchmark.\n",j);

    time0 = getime();
    a = sav_sub(j);
    dtime = getime() - time0;

    printf("a = %.10f \t",a);
    if(j > 1)
        da = a/((double) j) - 1.0;
    else
        da = 0.0;
    printf("  da = %e\n",da);
    printf("SAVAGE benchmark is done.\n");
    printf("%ld loops of %s took %.3f seconds.\n\n", j, argv[0], dtime);

    CloseLibrary(IntuitionBase);
}

/*==============================<  GETIME
>==============================
 *  Get the current time to a millisecond modulo 100,000 seconds.
*/
double
getime()
{    double time;
    unsigned long seconds, microsec;

    CurrentTime(&seconds, &microsec);
    time = seconds % 100000;
    time += (float) microsec / 1.0e6;
    return time;
}
```

Table Two: Summary of MC68881 macros

FBCC This is used just after a floating-point comparison such as (REGREG fcmp,fp2,fp3) and branches depending on the result of the comparison. In the comparison, the source register is subtracted from the destination register and the branch to the address is taken if the condition is true. The various tests are summarized in the condition code section of the MC68881.i file.

FMOVEROM Puts a '881 double precision constant into one of its internal floating-point registers. The constants include PI (3.1415...), ONE, ZERO, powers of TEN, and various logarithms.

PROCD0D1toFPN Using the source data in the D0/D1 register pair, perform the indicated operation and store the result in the destination MC68881 internal register. Typically, this is used just to move double precision data into a '881 floating-point register, FPN, but it can also be used to add D0/D1 into FPN or take the sine of D0/D1 and store the result into FPN.

PROCFPNtoD0D1 This is the inverse of the PROCD0D1toFPN macro in that now the D0/D1 register pair in the 68000 is the destination for the double precision operation. Typically, this is used just to transfer data out of the '881.

REGREG Perform a floating-point operation (fmove, fadd, fsin, etc.) using the source and destination registers.

SETUP_881 Setup 68000 address registers A1/A2 to point to the MC68881 operand and base registers respectively.

SHUTDOWN_881 Restore the A1/A2 address registers.

```
/*
 *  io68881.library test program and
 *  math chip locator
 *
 *  by Jim Goodnow II
 */

struct Library * OpenLibrary();

struct {
     struct Library io8_lib;
     void           *io8_68881;
} *lib_881;

void
test_881()
{
     lib_881 = OpenLibrary("io68881.library", 0L);

     if (lib_881)
      {   printf("io68881.library loaded at $%08lx\n", lib_881);

          if (lib_881->io8_68881 != 0)
          {   printf("68881 chip located at $%08lx\n", lib_881-
>io8_68881);
               MC68881_BASE = lib_881->io8_68881;
               CloseLibrary(lib_881);
          }
          else
          {   printf("No math chip found!\n");
               CloseLibrary(lib_881);
               exit(-2);
          }
     }
      else
     {   printf("io68881.library open failed!\n");
          exit(-1);
      }
}
```

Listing Two
SAV_SUB.C

```
/*============================<  SAV_SUB.C
>==============================
 *
 *   COPYRIGHT (C) 1988, 1989 by Read Predmore.
 */
double    tan(), atan(), exp(), log(), sqrt();

double
sav_sub(j)
long    j;
{
     register long i;
     double   a;

     a = 1.0;
     for (i = 1; i<j; i++)
     {
/*         a = tan(atan(exp(log(sqrt(a*a))))) + 1.0;  */
          a *= a;
          a = sqrt(a);
          a = log(a);
          a = exp(a);
          a = atan(a);
          a = tan(a);
          a += 1.0;
     }
     return a;
}
```

Listing Three
SAV_SUB_881.asm

```
;/*============================<  SAV_SUB_881.asm  >==================
;
;    Copyright (C) 1988, 1989 by Read Predmore
;
;    cc +fi -a -n -t -o sav_sub_881.asm sav_sub.c
;
;double   tan();
;double   atan();
;double   exp();
;double   log();
;double   sqrt();
;
;/*============================<  SAV_SUB  >=====================
;double
;sav_sub(j)
;long    j;
# 10 'sav_sub.c' 340148159
^| .3
     public    _sav_sub
_sav_sub:

     include   MC68881.I

     link a5,#.2
     movem.l   .4,-(sp)

     SETUP_881
;{
;    register long i;
;    double   a;
;
;    a = 1.0;
~ a -8 "d"
~ i d4 "l"
~~ j 8 "l"
^^^^^
     FMOVEROM  ONE,fp1        ;  move.l #$3ff00000,-8(a5)
     REGREG      fmove,fp1,fp2  ;  move.l #$00000000,-4(a5)
;    for (i = 1; i<j; i++)
^    move.l    #1,d4
     bra  .8
i_loop
;    {
^;/*      a = tan(atan(exp(log(sqrt(a*a))))) + 1.0;  */
;         a *= a;
^^
     REGREG       fmul,fp2,fp2   ;  move.l   -8(a5),d2
                                 ;  move.l   -4(a5),d3
                                 ;  move.l   -8(a5),d0
                                 ;  move.l   -4(a5),d1
                                 ;  jsr  .Pmul#
                                 ;  move.l   d0,-8(a5)
                                 ;  move.l   d1,-4(a5)

;         a = sqrt(a);
^
     REGREG       fsqrt,fp2,fp2  ;  move.l   -4(a5),-(sp)
                                 ;  move.l   -8(a5),-(sp)
                                 ;  jsr  _sqrt
                                 ;  add.w #8,sp
                                 ;  move.l   d0,-8(a5)
                                 ;  move.l   d1,-4(a5)
;         a = log(a);
^
     REGREG       flogn,fp2,fp2  ;  move.l   -4(a5),-(sp)
                                 ;  move.l   -8(a5),-(sp)
                                 ;  jsr  _log
                                 ;  add.w #8,sp
                                 ;  move.l   d0,-8(a5)
                                 ;  move.l   d1,-4(a5)
;         a = exp(a);
^
     REGREG       fetox,fp2,fp2  ;  move.l   -4(a5),-(sp)
                                 ;  move.l   -8(a5),-(sp)
                                 ;  jsr  _exp
```

(continued)

Table Three: Macro Quick Reference

USAGE		EXAMPLE	
FBCC.<size>	condition,address	FBCC.s	lt,loop_exit
FMOVEROM	constant,FPN	FMOVEROM	Eto1,fp3
PROCD0D1toFPN	instruction,FPdestination	PROCD0D1toFPN	fmove,fp7
PROCFPNtoD0D1	instruction,FPsource	PROCFPNtoD0D1	fsin,fp2
REGREG	instruction,FPsource,FPdest.	REGREG	fmul,fp1,fp2

```
                                ;  add.w#8,sp
                                ;  move.l   d0,-8(a5)
                                ;  move.l   d1,-4(a5)
;       a = atan(a);
^
    REGREG      fatan,fp2,fp2   ;  move.l   -4(a5),-(sp)
                                ;  move.l   -8(a5),-(sp)
                                ;  jsr _atan
                                ;  add.w#8,sp
                                ;  move.l   d0,-8(a5)
                                ;  move.l   d1,-4(a5)
;       a = tan(a);
^
    REGREG      ftan,fp2,fp2    ;  move.l   -4(a5),-(sp)
                                ;  move.l   -8(a5),-(sp)
                                ;   jsr_tan
                                ;   add.w    #8,sp
                                ;  move.l   d0,-8(a5)
                                ;  move.l   d1,-4(a5)
;       a += 1.0;
^
    REGREG      fadd,fp1,fp2    ;  move.l   #$3ff00000,d2
                                ;  move.l   #$00000000,d3
                                ;  move.l   -8(a5),d0
                                ;  move.l   -4(a5),d1
                                ;  jsr .Padd#
                                ;  move.l   d0,-8(a5)
                                ;  move.l   d1,-4(a5)
;   }
^.5
    add.l#1,d4

.8
    cmp.l8(a5),d4
    blt  i_loop
.6
;   return a;
^
    PROCFPNtoD0D1   fmove,fp2   ;  move.l   -8(a5),d0
                                ;  move.l   -4(a5),d1
.9
    SHUTDOWN_881
    movem.l   (sp)+,.4
    unlk a5
    rts
;}
^.2  equ  -8
.4   reg  d4
.3
;
# 30
|
~ _sav_sub * "{d"
~ _sqrt * "{d"
~ _log * "{d"
~ _exp * "{d"
~ _atan * "{d"
~ _tan * "{d"
    public   _sqrt
    public   _log
    public   _exp
    public   _atan
    public   _tan
    public   .begin
    dseg
    public   _MC68881_BASE
    end
```

Listing Four
MC68881.I

```
;============================< MC68881.I >=========================
;
;    COPYRIGHT (C) 1988, 1989 by Read Predmore
;
;    29 November 1988 @ 21:57
;

; MC68881_BASE equ  $E90180   ;  For Microbotics Multi-function module.

response  equ       $00       ;  MC68881 response register
command       equ       $0a       ;  MC68881 command register
condition equ       $0e       ;  MC68881 condition register
operand       equ       $10       ;  MC68881 operand register

tfbit     equ     $00         ;    TRUE/FALSE bit of the response
register
```

```
fp0             equ       $00       ;  Floating-point register 0
fp1             equ       $01       ;  Floating-point register 1
fp2             equ       $02       ;  Floating-point register 2
fp3             equ       $03       ;  Floating-point register 3
fp4             equ       $04       ;  Floating-point register 4
fp5             equ       $05       ;  Floating-point register 5
fp6             equ       $06       ;  Floating-point register 6
fp7             equ       $07       ;  Floating-point register 7

fmvtofp         equ     $5400       ;  move to fp reg (double)
fmvfrfp         equ     $7400       ;  move from fp reg (double)

fmove       equ     $00         ;  move
fint        equ       $01         ;  integer part (round to nearest)
fsinh       equ       $02         ;  hyperbolic sine (source)
fintrz          equ       $03         ;  integer part, round-to-zero
(truncate)
fsqrt       equ       $04         ;  square root (source)
flognp1         equ       $06         ;  natural logarithm (source + 1.0)
fetoxm1         equ       $08         ;  [(e**x) - 1.0]

ftanh       equ       $09         ;  hyperbolic tangent (source)
fatan       equ       $0a         ;  arc tangent (source)
fasin       equ       $0c         ;  arc sine (source)
fatanh          equ       $0d         ;  hyperbolic arc tangent (source)
fsin        equ       $0e         ;  sine (source), source in radians
ftan        equ       $0f         ;  tangent (source),  source in radians

fetox       equ       $10         ;  e**(source)
ftwotox         equ       $11         ;  2**(source)
ftentox         equ       $12         ;  10**(source)
flogn       equ       $14         ;  natural logarithm (source)
flog10          equ       $15         ;  logarithm to the base 10 (source)
flog2       equ       $16         ;  logarithm to the base 2 (source)

fabs        equ       $18         ;  absolute value (source)
fcosh       equ       $19         ;  hyperbolic cosine (source)
fneg        equ       $1a         ;  negate (source)
facos       equ       $1c         ;  arc cosine (source)
fcos        equ       $1d         ;  cosine (source), source in radians
fgetexp         equ       $1e         ;  get exponent (source)
fgetman         equ       $1f         ;  get mantissa (source)

fdiv        equ       $20         ;  divide (destination / source)
fmod        equ       $21         ;  modulo remainder
fadd        equ       $22         ;  add (source) to (destination)
fmul        equ       $23         ;  multiply (source) by (destination)
fsgldiv         equ       $24         ;  single precision divide
frem        equ       $25         ;  IEEE remainder
fscale          equ       $26         ;  scale exponent
fsglmul         equ       $27         ;  single precision multiply

fsub        equ       $28         ;  subtract (destination - source)
fcmp        equ       $38         ;  compare  (destination - source)

;===========< Condition Codes for the Branch Instructions
>=============

; D = destination register
; S = source register

eq              equ       $01   ;  equal                    D  = S
ge              equ       $13   ;  greater than or equal    D >= S
gl              equ       $16   ;  greater or less than     D != S
gt              equ       $12   ;  greater than             D >  S
le              equ       $15    ;  less than or equal       D <= S
lt              equ       $14    ;  less than                D <  S

neq             equ       $0e   ;  not equal                D != S
nge             equ       $1c   ;  not greater than or equal D <  S
ngl             equ       $19   ;  not greater or less than  D  = S
ngt             equ       $1d   ;  not greater than          D <= S
nle             equ       $1a    ;  not less than or equal    D >  S
nlt             equ       $1b    ;  not less than             D >= S

;=========================< ROM CONSTANTS >============================

PI              equ       $00
LOG10_2         equ       $0B
Etol        equ       $0C
LOG2_E          equ       $0D
LOG10_E         equ       $0E
ZERO        equ       $0F
LOGN_2          equ       $30
LOGN_10         equ       $31
ONE             equ       $32
TEN             equ       $33
TEN_2       equ       $34
TEN_4       equ       $35

*    NULL Come Again Macro
NULCAmacro              ;  used to check that MC68881 is ready for data
\@w68cmp.w#$8900,(a2) ;  read response register
    beq  \@w68              *  reread until ready to transfer data
    endm
```

```
*    NULL Release Macro
NULREL    macro                ;  used to wait for MC68881 to finish
\@nr tst.w(a2)          ;  a move or floating-point operation
     bmi  \@nr
     endm

SETUP_881 macro
     move.l    a2,-(sp)
;    move.l    a1,-(sp)
     movea.l   _MC68881_BASE,a2    ; points to base of 68881 regs
;    lea       operand(a2),a1 ; preload a1
;    jsr       _Forbid
     endm

*    releases the 68881 for use by other tasks
SHUTDOWN_881   macro
;    jsr       _Permit
;    move.l    (sp)+,a1
     move.l    (sp)+,a2
     endm

FBCC      macro          ;  FBCC.<size> condition,address
          move.w   #\1,conditiona2)
\@nopass  move.w    response(a2),d0
          bmi.s\@nopass
          btst #tfbit,d0
          bne.\0    \2
          endm

FMOVEROM  macro          ;  Usage FMOVEROM   constant, FPN
     move.w    #$5C00+(\2<<7)+\1,command(a2)
     NULREL
     endm

PROCD0D1toFPN  macro     ;    FPROCD0D1toFPN  instruction,FPdestination
     move.w    #fmvtofp+(\2<<7)+\1,command(a2)
     NULCA
     move.l    d0,operand(a2)
     move.l    d1,operand(a2)
     NULREL
     endm

PROCFPNtoD0D1  macro     ;    PROCFPNtoD0D1  instruction,FPsource
     move.w    #fmvfrfp+(\2<<7)+\1,command(a2)
     NULCA
     move.l    operand(a2),d0
     move.l    operand(a2),d1
     NULREL
     endm

REGREG    macro     ;    REGREG    instruction,FPsource,PFdestination
     move.w    #(\2<<10)+(\3<<7)+\1,command(a2)
     NULREL
     endm

;=====================< END of MC68881.I macro file
```

Listing Five
Makefile for Savage benchmark

Makefile for Various Savage Benchmarks

The makefile for the various Savage benchmarks is shown in listing 5. Four different versions of an executable program are needed to test the various math options on the Amiga:

sav_881MC68881 assembler version from **savage.c** and **sav_sub_881.asm**

sav_ma MA.LIB version from savage.c and sav_sub.c

sav_mt MT.LIB version from savage.c and sav_sub.c

sav_ffp M.LIB version using FFP from savage.c and sav_sub.c

The command, make, will only compile, assemble and link sav_881. The other versions are obtained by the commands, make sav_ma, make sav_mt and make sav_ffp.

```
# MAKEFILE for Savage benchmark for transcendental calculations.
# This version uses the Manx Aztec C compiler version 3.60a
# Copyright (C) 1988, 1989 by Read Predmore
sav_881:              savage.o sav_sub_881.o
     ln -g -o sav_881 savage.o sav_sub_881.o -lmt -lc
Sav_ma:               savage.o sav_sub.o
     ln -g -o sav_ma savage.o sav_sub.o -lma -lc
Sav_mt:               savage.o sav_sub.o
     ln -g -o sav_mt savage.o sav_sub.o -lmt -lc
Sav_FFP:  savage.c sav_sub.c
     cc +FF -n -o sav_ffp.o savage.c
     cc +FF -n -o sav_sub_ffp.o sav_sub.c
     ln -g sav_ffp.o sav_sub_ffp.o -lm -lc
savage.o:   savage.c
     cc +FI -n savage.c
sav_sub.o:     sav_sub.c
     cc +FI -n sav_sub.c
sav_sub_881.o:  sav_sub_881.asm
     as -n       sav_sub_881.asm
```

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BREAKING the .bmap BARRIER

Streamlining Your AmigaBASIC Library Access with Quick_Lib

by Robert D'Asto

AmigaBASIC's ability to access the ROM Kernel routines via the LIBRARY statement makes it a very powerful and flexible language. The relative friendliness of BASIC coupled with the power and range of the Amiga system is a combination hard to resist.

There is one aspect of accessing the system libraries, however, which I find quite awkward: bmap files. To adjust one ROM routine to a program, we must ensure that the appropriate bmap is available during runtime and that the LIBRARY statement in our source code accurately states its current whereabouts. If the program is moved to another disk, the bmap file must follow or, at runtime, our pride and joy will be a "File Not Found" dud.

This introduces a considerable frailty to programs which are written to access system libraries. We can't expect a nonprogrammer to know about and keep track of bmap files, so sharing our programs with others becomes an iffy proposition. When this situation involves several programs on a single disk, each accessing several different libraries, things can get even more complicated.

One partial solution I have tried is including the complete contents of one or more bmap files within the source code itself in the form of hex DATA statements. A special routine at the beginning of the program then loads the bmaps onto the RAM disk, followed by a statement like LIBRARY "RAM:graphics.library" to get things rolling. If the program is compiled with Absoft's AC/BASIC Compiler, we can produce an altogether superior module with no strings attached.

One disadvantage to the above system, though, is the time it takes to load the bmap file into RAM. Loading just one bmap can take 10 seconds or more - too long for my taste. Loading two or more bmaps produces a lag that would cause any user to wonder if the program hadn't crashed before it was even out of the gate. A "Please Wait..." message isn't much help as the machine is completely silent during this operation, giving the impression that nothing is happening.

Another disadvantage to this system is the sheer number of DATA statements required to represent most bmaps. The "graphics.bmap", for example, requires over 1,600 hex statements. We can get around this somewhat by writing a separate routine, which converts a bmap to a hex series, and then MERGE the result into our program. But we run into a problem again if we want to share our source code with other programmers. Ever try to coax an editor into publishing a "typecin program" containing 3,000 or so hex statements? It's a waste of time and space to have all that hex data in a source listing when only a few bytes (pertaining to the routines actually used) are needed.

Well, now that I have thoroughly dissuaded you from ever using a LIBRARY call again... Tah dah! Here's the solution: Quick_Lib.

What's Quick_Lib?

Quick_Lib is a source code generation utility for AmigaBASIC programmers which acts as a "bmap optimizer". Using it will eliminate the need of having bmap files on disk

with your programs during runtime. It does this without adding gobs of hex statements to your source code, or disk-grinding pauses, or long bmap-loading delays at runtime. The code generated by Quick_Lib will allow nearly instant, no-fuss access to the Amiga system libraries. Your programs will be self-contained listings which can be moved about to your heart's content and, if you own the Absoft compiler, can be turned into fast and truly stand alone executables. It's also extremely easy to use, and does not alter your existing bmap files in any way.

Also, Quick_Lib itself contains no representations of bmaps within its source code. It simply loads any existing bmap file and asks the user which routines from this bmap are desired. Quick_Lib then searches the bmap for only those few bytes of data associated with these routines. It then pumps out a skinny AmigaBASIC subprogram which will allow access to them.

Enter the Quick_Lib code listing and save it on the same disk as your bmap files and interpreter. We'll step through this using an example application: You're working on a program which requires, let's say, three routines from the graphics library.

Okay, here's the drill. All quotation marks are for clarity. Do not enter them except where noted.

1. Start up Quick_Lib.

2. Select "Load bmap" from the menu.

3. The program will then ask which bmap you wish to use. In this example we'll be using graphics so enter "graphics.bmap". If your bmap files are in a separate or subdirectory, you'll need to include the full path name, for example: "BMAPS/graphics.bmap". Quick_Lib will then load this bmap file into RAM.

4. You'll now be asked for the first routine in this bmap that you wish to use in your program. Enter its name and press RETURN. Remember, the names of ROM Kernel routines are case sensitive, so if you want the routine "Draw", don't enter "draw" or "DRAW".

5. Repeat step 4 for the other two graphics routines.

6. After you've entered all the graphics routines, simply press RETURN as indicated.

7. You'll now be asked for the name of a destination file. This file will hold the AmigaBASIC source code, which Quick_Lib will generate. The code will be in the form of a subprogram (this will be explained in more detail later). Use any legal file name you wish. Include the path name if desired, for example, "MySubs/gfx.lib", or just "gfx.lib" if you don't want it in a special drawer.

8. If you're going to be using routines from another library (we aren't in this case) you would, after disk activity had ceased, select "Load bmap" again from the menu. Then repeat steps 1 through 7 for the next library, this time using a different file name for step 7.

9. Select "Quit" from the menu.



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Now, open your AmigaBASIC interpreter. You can load up your program-in-progress if you wish. Click on your output window (on the left) and type: MERGE "filename" (quotes included), where "filename" is the name of the destination file you used in step 7. Include the path name, if any.

A subprogram should now appear in the list window. If you had previously loaded a program into the interpreter, the sub will appear at the end of that listing. In this case, the subprogram will be called "Init.graphics.lib".

Assuming the Quick_Lib code listing was entered without errors, this subprogram will contain the statements necessary to load an abbreviated bmap file onto the RAM disk, which contains only the data needed to access the routines you had given Quick_Lib earlier. This edited bmap file will still have the name "graphics.bmap", and it will fulfill its normal function in allowing AmigaBASIC to access the routines it contains. The sub also contains a LIBRARY statement to open the graphics.library. As you can see, the subprogram loads only a small fraction of the entire bmap data (over 1,600 bytes in this case).

Now all that's needed to access your selected library routines is to type "Init.graphics.lib" at or near the top of your program listing. This will call the subprogram, which will do the rest. No further LIBRARY statement is needed and, of course, no separate bmap files!

(continued)

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Notes On Use

Whichever bmap you use, the name of the subprogram generated will match it. For example, when using Quick_Lib with the exec.bmap, the sub created will be called "Init.exec.lib", and so on. You can use as many or as few routines from the selected
library as you wish.

Any selected routines which require a DECLARE FUNCTION statement will still require it. For example, if your program uses the exec routine AllocMem, the coding would be:

```
DECLARE FUNCTION AllocMem&() LIBRARY
```

Init.exec.lib and off you go.

Your program's exit or ending routine will require a LIBRARY CLOSE statement. It is also recommended that, although they are small, the abbreviated bmaps which were loaded onto the RAM disk be removed when your program ends. Here's an example of an exit routine for a program that used the graphics and Intuition libraries:

```
EndIt:
LIBRARY CLOSE
KILL "RAM:graphics.bmap"
KILL "RAM:intuition.bmap"
END
```

This keeps everything neat and polite.

Below is a sample subprogram written by Quick_Lib which allows access to the graphics routines Move and Draw. Use it as a model to debug any errors in entering the code listing by comparing it to the output of your Quick_Lib. Run the program, load the graphics.bmap, and enter "Move" and "Draw" (no quotes). After specifying a destination file, open the interpreter and MERGE your file into the editor. It should look like this

```
        SUB Init.graphics.lib STATIC
        fd$=fd$+"Move"+CHR$(0)

fd$=fd$+CHR$(255)+CHR$(16)+CHR$(10)+CHR$(1)+CHR$(2)+CHR$(0)
        fd$=fd$+"Draw"+CHR$(0)

fd$=fd$+CHR$(255)+CHR$(10)+CHR$(10)+CHR$(1)+CHR$(2)+CHR$(0)
        OPEN "RAM:graphics.bmap" FOR OUTPUT AS 1
        PRINT #1,fd$;
        CLOSE 1
        LIBRARY "RAM:graphics.library"
        END SUB
```

This sample subprogram loads a duplicate of those bmap sections pertaining to the selected routines onto the RAM disk, and opens the appropriate library. You can see the names of the two routines in the code, each ending with a null (CHR$(0)) character. Each is then followed by ASCII characters which provide AmigaBASIC with information about the routine's location in the library, and which of the 68,000 chip's internal registers to use for parameters.

Don't worry if your Quick_Lib-generated subprograms contain an extra space within parentheses on the CHR$ statements. That's a quirk of AmigaBASIC's number-handling procedure, and it will not affect how the subs run. If your sub doesn't match the one above, check over the GetRoutine section of the listing carefully. The most typo-prone lines are those with text strings. Be sure to include the spaces within strings where indicated.

This version of Quick_Lib does not contain a great deal of error trapping features, so it is possible to fool it. For example, entering a single letter, or just the last few letters of a routine name, will produce an incorrect name in the final code. Be sure to use the complete name when entering it, with correct upper and lower case letters. It is also assumed that the user, being an intermediate to advanced BASIC programmer, will be familiar with using file names, path names, and so on. There is one little "goof proof" thrown in, though: If you've entered one or more routine names and then discover you've made a mistake, simply press the delete key and then press RETURN. This will delete the names you've entered and put you back to the first request for a routine, without having to quit and reload the bmap.

How much faster will your programs access the system libraries with Quick_Lib subprograms? Using the normal bmap method usually takes about two seconds of disk grinding per bmap. Loading an entire bmap onto the RAM disk from source code can take 10 seconds or more. Loading a Quick_Lib abbreviated bmap with, say, three routines takes only about two tenths of a second with the interpreter. It's even faster if you compile your listing. Either way, it is nearly instant for most any application.

If you own the Absoft compiler, the Quick_Lib listing will compile as written. After compilation, I suggest keeping Quick_Lib on disk with your interpreter. You can then use it while working on a program listing without having to clear the

AmigaBASIC editor. The subprograms generated by Quick_Lib will, of course, also be compatible with the compiler.

I hope you won't think I'm just trying to hype my own little program, but I use Quick_Lib all the time now. Why use on-disk bmap files when it's unnecessary?

Give it a try. Until I (or you) discover a slicker way to access library routines, I think I'll just stick with it.

```
'* * * * * * * * * * * *
'*                      *
'*     QUICK_LIB        *
'*                      *
'*                      *
'*    source code       *
'*         by           *
'*    Robert D'Asto     *
'*                      *
'* * * * * * * * * * * *

ON BREAK GOSUB endit
BREAK ON

MENU 1,0,1," Project    "
MENU 1,1,1," Load bmap "
MENU 1,2,1," Quit       "

MENU 2,0,0,"            "
MENU 3,0,0,"            "
MENU 4,0,0,"            "

ON MENU GOSUB MenuSort
MENU ON

WHILE -1
SLEEP
WEND

MenuSort:
IF MENU(1)=1 THEN GOSUB Loadbmap
IF MENU(1)=2 THEN GOSUB endit
RETURN


Loadbmap:
bmap.name$=""
lib.name$=""
subname$=""
Q$=CHR$(34)
CLS
startload:
PRINT
PRINT "Name (including pathname) of desired"
INPUT "bmap to load ";b$
IF RIGHT$(b$,5) <> ".bmap" THEN
    PRINT
    PRINT "Spelling is incorrect or file"
    PRINT "is misnamed.  A bmap file name"
    PRINT "must end with " + Q$ +".bmap" + Q$ + "."
    GOTO startload
END IF

OPEN b$ FOR INPUT AS 1
bmap$=INPUT$(LOF(1),1)
CLOSE 1

'extract name of library from
'full pathname entered above
namelength%=LEN(b$)
startpoint%=namelength%-5
rf$=""
rev$=""
control%=100

WHILE control% > 96 AND control% < 123 AND startpoint% > 0
  rf$=MID$(b$,startpoint%,1)
```

(continued)



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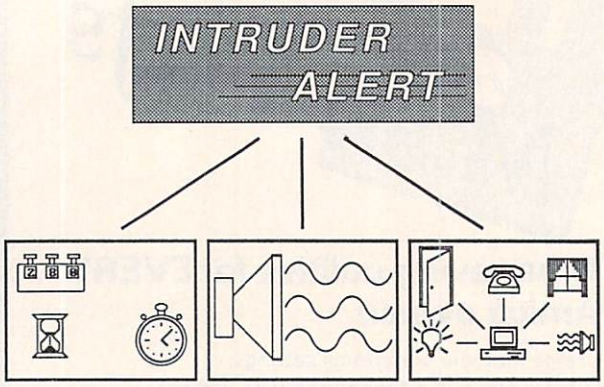
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```
  control%=ASC(rf$)
  rev$=rev$ + rf$
  startpoint%=startpoint%-1
WEND

revlen%=LEN(rev$)
test%=ASC(RIGHT$(rev$,1))

IF test% > 96 OR test% < 123 THEN
    rev$=LEFT$(rev$,revlen%-1)
END IF

n$=""
FOR x%=revlen% TO 1 STEP -1
  n$=n$ + MID$(rev$,x%,1)
NEXT

'use name extracted above to
'create appropriate names for
'library, bmap and subprogram
bmap.name$=n$ + ".bmap"
lib.name$=n$ + ".library"
subname$="Init." + n$ + ".lib"

'call the GetRoutine sub, passing the
'complete bmap and above names to it
GetRoutine bmap$,lib.name$,bmap.name$,subname$
NewCycle
RETURN

endit:
MENU RESET
END
RETURN

SUB GetRoutine (bmap$,lib$,bn$,s$) STATIC
CLS

Start:
routine$=""
fd$=""
Q$=CHR$(34)

PRINT
PRINT "Name of first " + lib$ + " routine"
INPUT "you wish to use ";routine$
IF routine$="" THEN Start

Again:
fd$=fd$ + "fd$=fd$+" + Q$ + routine$ + Q$
fd$=fd$ + " + CHR$(0)" + CHR$(10)

'find the routine within the bmap

routine$=routine$+CHR$(0)
offset%=INSTR(bmap$,routine$)

IF offset%=0 THEN
  PRINT "I can't find this routine."
  PRINT "Check spelling."
  GOTO Start
END IF

length%=LEN(routine$)
count%=offset% + length%
fd$=fd$ + "fd$=fd$+"

'extract offset and parameter data
'for this routine from the bmap

char$=""
WHILE char$ <> CHR$(0)
    char$=MID$(bmap$,count%,1)
    fd$=fd$ + "CHR$("+STR$(ASC(char$)) + ")" + "+"
    count%=count%+1
WEND

newlength%=LEN(fd$)-1
fd$=LEFT$(fd$,newlength%)
fd$=fd$+CHR$(10)

PRINT
PRINT "Thank you.  Next routine?"
INPUT "(if none press RETURN) ",routine$
IF routine$="" THEN
    GOTO GoOn
   ELSEIF routine$=CHR$(127) THEN
    GOTO Start
   ELSE
    GOTO Again
END IF

GoOn:
final.length%=LEN(fd$)-1
fd$=LEFT$(fd$,final.length%)
PRINT
INPUT "name of destination file ";destfile$
IF destfile$="" THEN GoOn
F$=" FOR OUTPUT AS 1"
OPEN destfile$ FOR OUTPUT AS 1
PRINT #1,""
PRINT #1,"SUB " + s$ + " STATIC"
PRINT #1,fd$
PRINT #1,"OPEN " + Q$ + "RAM:" + bn$ + Q$ + F$
PRINT #1,"PRINT #1,fd$;"
PRINT #1,"CLOSE 1"
PRINT #1,"LIBRARY " + Q$ + "RAM:" + lib$ + Q$
PRINT #1,"END SUB"
CLOSE 1
END SUB

SUB NewCycle STATIC
CLS
Q$=CHR$(34)
PRINT "If you wish to use routines"
PRINT "from another library select"
PRINT Q$ + "Load bmap" + Q$ + " from menu."
END SUB
```

•AC•

Fractal Fundamentals

Part I

Experiment at the very edge of a new science by learning to write your own programs to make fractals on your Amiga.

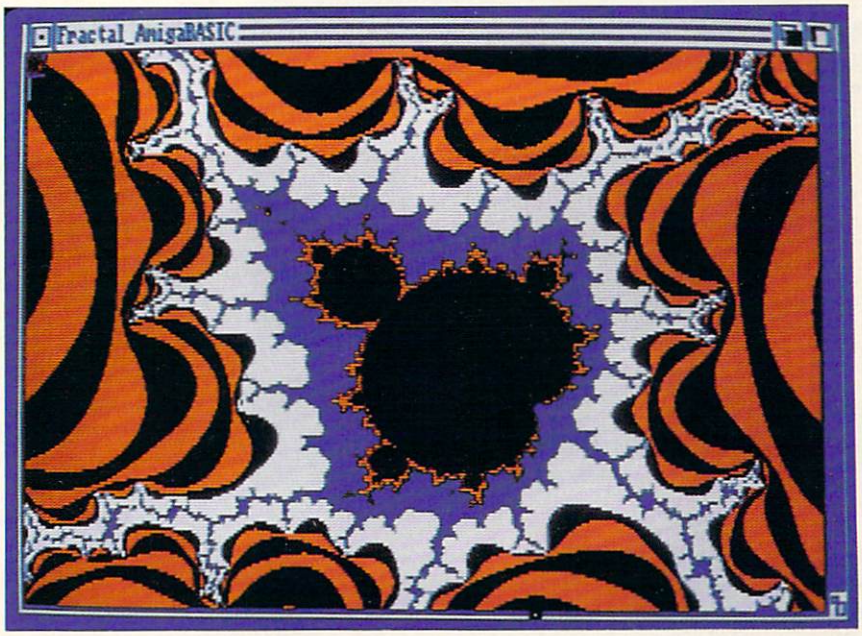


Figure One Creating fractals with AmigaBASIC

by Paul Castonguay

Fractals are computer generated images that contain an infinite variety of shapes and patterns. The recently published book "The Beauty of Fractals" by Peitgen and Richter is full of excellent examples. They often resemble flowers, snowflakes, clouds, coastlines, and even lightning. Some people feel that fractals have artistic beauty. Close inspection reveals that they also contain recurring patterns of great similarity, which suggests a certain mathematical order. I find that it is this combination of variety and similarity that makes them so appealing.

How often have you admired pictures of these fractals and wondered exactly how they are made? Articles written so far have been directed towards a high level audience and instructions on how to produce them on your own computer have been difficult to follow. If you are an average home computer enthusiast with an average education, you might conclude that fractals are simply beyond you. Yet, nothing could be further from the truth. So why do they make it look so complicated? Personally, I think that it's because the discovery of fractals is so recent that books about them are still written in the language of the mathematicians and computer scientists who first uncovered them. It is only a matter of time before magazines like Amazing Computing start presenting the subject in more understandable language. This is the first of a series of articles that will do just that.

What sort of background will you need before you start? Let's have a short test. Can you program your computer to count to 100? Like this:

```
FOR I=1 TO 100
PRINT I
NEXT I
```

Do you understand what is meant by an equation like this:

```
x = 9
```

Do you understand that if the above equation is true, that the following equation must also be true?

```
2 * x = 18
```

Can you solve for x in the following equations?

```
3 * x = 21
x = ?

x + 10 = 13
x = ?
```

The exam is over. The answers are x=7 and x=3.

So you see, I am writing these articles for anyone who can write very simple programs in BASIC, and who understands what a variable means in algebra.

Is understanding how it's done neccessary?

If you are interested in producing fractals on your Amiga without knowing anything about their underlying mathematical mysteries, you can do so with one of many public domain programs. Just recently I noticed that Fred Fish disk #130 has a program called QMan which will produce them. Look through

(continued)

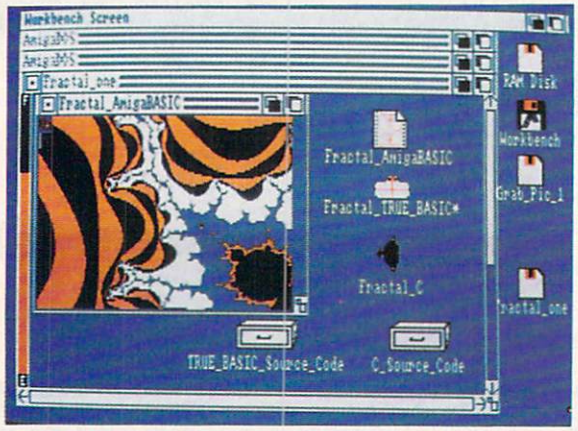


Figure Two *(top)* Resizing AmigaBASIC's output window

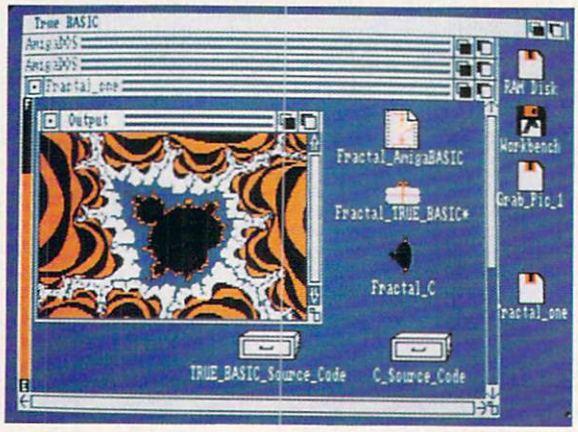


Figure Three *(bottom)* Activating and resizing TRUE BASIC's output window

the entire Fred Fish library, and other public domain libraries, for programs containing the name Mandelbrot (Benoit Mandelbrot is the name of the mathematician we should thank for discovering fractals). Some of the programs are better for speed while others have fancy features that allow you to edit your fractals and save your work.

Understanding is fun!

Many users enjoy tinkering with programming concepts, and I am one of them. In fact, it is the very concept of programmability that makes computers so interesting to me. I don't pretend to be able to write commercial quality software. Programming for me is a hobby, not a profession and I know that for every program that I write myself, I could easily buy a dozen that would do a better job. Yet there is a certain pleasure derived in "doing it myself." So when I first learned about fractals, I was interested in finding out exactly how they were produced. Was the math complicated? Did they take a long time to produce? Did they require a supercomputer?

Playing with fractals has an added benefit: they offer an opportunity for the home enthusiast to experiment at the very edge of a new science. It was only in 1975 that the word fractal was defined by Benoit Mandelbrot, and only 1980 that he discovered the set of equations which now bears his name. Working on your own you may generate many fractals not yet seen. Billions of variations are possible. Your solutions will be based on certain decisions of color and range that only you yourself will make. You may discover fractals that have more artistic appeal than those you have seen published in books.

In these articles I will present a number of concepts that will allow you to write your own programs to make fractals on your Amiga. Some concepts must come from algebra and analytic geometry. That is to be expected. However, I will always keep in mind that the ultimate goal is to draw fractals. Mathematics will be discussed not as an academic subject, but as a tool that you can use to draw beautiful patterns on your computer screen. Other concepts will come from common sense. I will talk about methods of programming that produce graphical solutions for a wide variety of mathematical equations. You will actually be able to use these methods to investigate equations that you may not really understand, but are simply curious about.

This Article

This first article simply presents the subject of fractals. The listings at the end contain an example. There is a single example given in three languages: AmigaBASIC, TRUE BASIC, and C. Figure 1 shows the screen output produced by the AmigaBASIC version. All three produce the same fractal pattern. When I chose this example I wanted to show you a fractal that had enough variety and artistic appeal to attract your interest. Yet, at the same time, the program which produced it had to be short enough for you to want to enter it. The idea here is not to understand the program, but only to enter and run it to see if the subject of fractals interests you.

WHY AmigaBASIC?

Someone is surely saying that AmigaBASIC should not be the language of choice for generating fractals. AmigaBASIC is slow. Well, how slow is slow?

The above mentioned example took the following lengths of time to execute:

Table One

Program execution times:

AmigaBASIC	16 hours, 57 minutes
TRUE BASIC	5 hours, 56 minutes
C	4 hours, 42 minutes

If these times seem surprisingly long to you, you are learning your first practical lesson about fractals, they take a long time to generate. You will understand why if you continue to read future installments in this series of articles. I wrote the program in C to give you an idea how AmigaBASIC stacks up against a competitive development language.

Now, answer me honestly. Is 17 hours too long to wait for a fractal to be generated? Well, I say it depends. Let's discuss the issues.

One reason that AmigaBASIC is slow is that it is an interpreted language. Ironically, that is an advantage in a teaching environment. Interpreted means that when you program in AmigaBASIC you do not have to compile and link your program as you do in C. In AmigaBASIC, compiling happens automatically when you run your program. That's a big

advantage. It allows you to stop your program anytime, make a modification, and then immediately execute the new version. It's like working interactively with the computer. In C you would have to compile and link the program every time you made a change to it. The time taken to do this can become very frustrating, especially if your are experimenting with a programming concept and making many changes to your program. So, the decision to use AmigaBASIC depends in part on whether or not you expect to be making many modifications to your program. In this series of articles, you will be doing that. In fact, one of the best ways to learn a programming concept is to enter and run examples which you are then free to modify. Hence, even though AmigaBASIC is slow, it is a good choice for these articles.

Another reason that AmigaBASIC is slow compared to C is that AmigaBASIC is a higher level language. Again, from a teaching point of view this is a big advantage. Higher level means that AmigaBASIC contains many simplified commands which do a lot of things for you that in another language would require many lines of programming. Take the subject of windows for instance. My example program in AmigaBASIC requires no special commands to open a window for the fractal to appear in. Compare that to C which requires special code involving structures, pointers, and a knowledge of Amiga's windowing system to do the same thing. AmigaBASIC allows you to concentrate on drawing fractals and not worry about how Amiga's windows work. Hence, even though AmigaBASIC is slow, it is a good choice for these articles.

Consider how quickly computing speeds have improved. Benoit Mandelbrot himself did not have the computing power of an Amiga when he started his work on fractals back in the 1970's. His first actual images were crummy smudges produced on a black and white plotter. What would he have given back then for a high resolution screen with 16 colors? Yet here we are, hardly 20 years later, complaining that we have to wait 17 hours for a fractal image.

In my opinion, 17 hours is not an unreasonable time to wait for a fractal image to be generated when you consider the objective, to learn how fractals are actually produced. The user friendly, interactive environment of AmigaBASIC far outweighs its disadvantage in speed. Later, when you feel you have learned enough, you may become more interested in simply generating them, and execution speed will become more important. It will make sense then to move on to programs written in C or some other development language.

There is, of course, a good intermediate solution to the speed problem, but it requires that you spend some money. You can run your programs in a compiled BASIC. That is one reason why I will be giving all my program examples in both AmigaBASIC and TRUE BASIC. TRUE BASIC is a popular compiled language that is somewhat faster than AmigaBASIC, and yet it still gives you a friendly interactive environment. It also has other advantages which I will discuss below. Another solution is to use AC/BASIC by Absoft. AC/BASIC will compile any program written in AmigaBASIC, resulting in an executable version that will run much faster. I don't own AC/BASIC so I cannot tell you how long it will take to execute my example.

Were you surprised that the C version of my program wasn't faster? It's because the computer is being asked to perform a lot of multiplications using floating point numbers (numbers with a decimal point). It takes longer for any computer to multiply floating point numbers than it does for it to multiply integer numbers (numbers with no decimal point). Now some people play programming tricks here to get the computer to perform the multiplications faster. Some of the public domain programs do this. I won't discuss such issues. I will have my hands full in these articles just explaining the fractals themselves.

For those who know C and have had some experience on the Amiga I should let you know that I used Lattice C 4.0 and compiled using the standard ieee floating point library, LCM.LIB. I put both files in RAM: and typed:

```
cd ram:
lc -Lm Fractal_C
```

I could have used the fast floating point library, LCMFFP.LIB by typing:

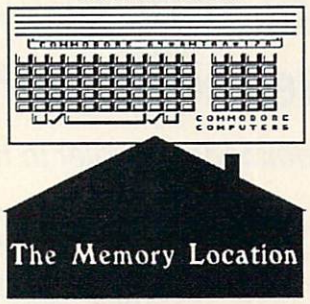
```
cd ram:
lc -f -Lf Fractal_C
```

This will speed up the program so that it completes the fractal in 2 hours, 27 minutes. Wow! This comfirms that most of the time is spent executing floating point operations. BASIC, however, has no fast floating point library. So comparing this version of the program in C to the AmigaBASIC version ends up comparing math libraries rather than languages. Also, there is the issue of the lower accuracy of the fast floating point math library.

(continued)

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TRUE BASIC

There are two advantages to using TRUE BASIC that I would like to mention in this first article.

The first is that any program written in TRUE BASIC will execute without modification on any of four different computers: Amiga, IBM, MAC, and ATARI-ST. I think that this is a tremendous advantage. I have long believed that all computers should be more compatible and TRUE BASIC has taken a giant step in that direction. I invite people to run the programs listed in my articles on other machines.

The second advantage to using TRUE BASIC is that it has commands that make this kind of work easier. Look at my example programs. The AmigaBASIC version has two complicated looking lines at the very beginning:

```
DEF FNx(x)=INT(((x-xmin)+dx/2)/dx)
DEF FNy(y)=186-INT(((y-ymin)+dy/2)/dy)
```

These are replaced in the TRUE BASIC version by the simple line:

```
set window xmin, xmax, ymin, ymax
```

This is an example of a high level advantage. TRUE BASIC, in this case, has a convenient command that does not exist in AmigaBASIC. AmigaBASIC must compensate by adding extra program lines putting an extra burden on the programmer. I will talk more about this particular example and others in future articles.

AmigaBASIC?

Now, don't conclude that I think AmigaBASIC is a lousy language. And don't think that you will need TRUE BASIC in any of these articles. Every example will be given in both AmigaBASIC and TRUE BASIC. Often I will point out examples where AmigaBASIC has advantages over TRUE BASIC. For instance, AmigaBASIC supports the Amiga's pull down menu system whereas TRUE BASIC does not. (Unless you buy TRUE BASIC's developer's toolkit, thus losing IBM compatibility.) When it comes to languages, I try to be honest, and I'm not afraid to point out when one language has certain advantages over another. Occasionally in these articles, examples will also be given in C.

AmigaBASIC's biggest advantage is that it is shipped with every machine. There is nothing to buy.

Programming for Speed

My approach in these articles is to write the example programs for maximum legibility. I don't try to use any programming tricks to improve execution speed. In fact, I make an effort to stay away from them. Experience has taught me that such "juggling of the code" all too often obscures the theory of operation. In my example programs, I rely heavily on the use of functions and subroutines which greatly improve the readability of the code. If, in reading these articles, you notice opportunities to increase execution speed, by all means, make the necessary adjustments. But I will be placing more emphasis on explaining fractals.

Multitasking

While I am writing these words in WordPerfect on my Amiga, a fractal is being calculated in the background. Yes, it does slow down the word processor a little. It scrolls more slowly, but that's perfectly acceptable. If you are running the AmigaBASIC version of my example, you can easily do the same thing. While the program is executing, simply shrink the size of the window that the fractal is being drawn in and you will see the workbench screen exposed underneath. See figure 2. You can insert another disk in one of the drives and fire up another program, as long as you don't re-boot your machine. Later, much later, when the Fractal_AmigaBASIC program is finished, you can expand the fractal's window back to full size and see the whole thing.

By the way, this is an opportunity to point out a high level advantage of AmigaBASIC. The ability of a window to display graphic information after that window has been first shrunk and then later expanded to full size requires that the system keep that information in a special temporary area of memory. On the Amiga, the effect is achieved using a concept called superbitmap. Never mind exactly what superbitmap really is or how to set it up, AmigaBASIC has already done it for you. You can enjoy its benefits with no programming effort on your part. In contrast, the C version of my example does not allow for this. I would have had to do a lot more programming to achieve it, and thus unnecessarily complicated my example program.

TRUE BASIC, on the other hand, handles the issue differently. If you do nothing special, TRUE BASIC opens a full size borderless window for you (no gadgets). Sometimes I like that feature because the screen looks less cluttered. However, you cannot multitask because you cannot shrink the graphics window to expose the Workbench, as there is no sizing gadget.

If, however, you activate TRUE BASIC's output window before running the program, the fractal goes there. Yet there is still a difference in the way TRUE BASIC operates compared to AmigaBASIC. Once the program starts executing, the resizing gadget is frozen, thus preventing the window from being resized. So, if you want to shrink the output window to expose the icons of other disks, you must do so before running the program. And, if you do that, TRUE BASIC does something further. It completely resizes the graphics produced by your program so that the entire fractal appears in the output window. Figure 3 shows the result of doing this. Does all this seem very strange to you? In some situations, especially when plotting graphics from algebraic equations, this is a very desirable characteristic. The window, however, is not a superbitmap window, like AmigaBASIC's. If after the program has finished drawing the fractal, you further shrink the window, you will permanently loose that part of the fractal. Expanding the window again will not get it back.

Saving the Picture

If you have entered my program and sat it out for 17 hours, you may have noticed that in the end there was no way to save the picture. A save feature would have required extra program lines and for this first example, I had to keep the length of the program down to an absolute minimum. Of course you can get a hard copy of your fractal if you have a printer with graphics by using the screen dump icon on the workbench. In future articles I will explain how to add a save feature to your programs.

There is a way to save your fractal to disk right now if you have a certain piece of software, called GRABBIT. With it you can save any screen on your Amiga. GRABBIT saves your pictures in IFF format and that means that you can then view them by using Deluxe Paint. That's right, you can use Deluxe Paint to interactively modify the fractal after your program has produced it. So you see, with a little software, even a short program like the one in this article can become an exciting experience. The Amiga is truly a revolutionary machine!

How does it work?

You may be anxious to find out exactly how this program works. Well, if you have some programming experience, you might be able to figure it out on your own. I have made an effort to write the program clearly. Notice the use of subroutines to break each task into a separate unit. Commands like "GOSUB Calculate" and "GOSUB Select.Color" should be self explanatory. If however your programming ability is a little soft, you may want to wait for future installments in this series. There may be more to these programs than meets the eye, and learning some concepts first might make it easier to set the story straight from the very beginning.

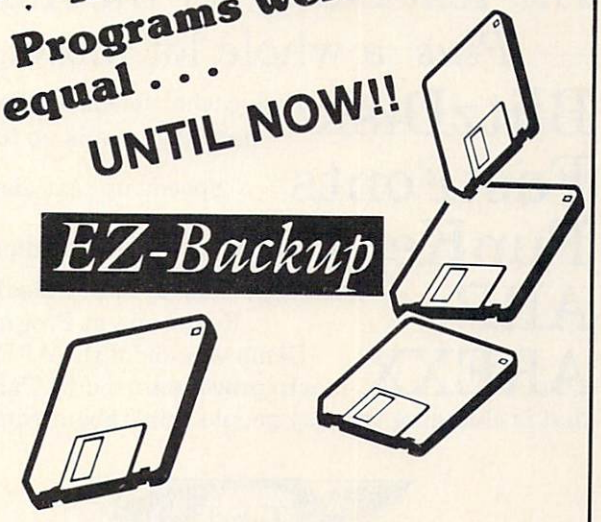
Coming up

Part II of this series will present the basics of computer graphics on any computer—coordinate systems. To draw anything on your computer screen, you must somehow tell the computer where to draw every dot to make up your picture. And, you guessed it, that's the job of a coordinate system. In Part II will also talk some more about fractals, introducing some of their most intriguing characteristics.

(continued)

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Listing One
Program example in **AmigaBASIC**

```
' Declare scaling functions
DEF FNx(x)=INT(((x-xmin)+dx/2)/dx)
DEF FNy(y)=186-INT(((y-ymin)+dy/2)/dy)

' Declare screen coordinates
xmin = -.18
xmax = -.14
ymin = 1.02
ymax = 1.05
dx = (xmax-xmin)/617
dy = (ymax-ymin)/186

Crunch = 500
M = 4

FOR j = ymin TO ymax+dy/2 STEP dy
  FOR i = xmin TO xmax+dx/2 STEP dx

    GOSUB Calculate
    GOSUB Select.Color
    PSET (FNx(i),FNy(j))

  NEXT i
NEXT j

END


Calculate:
    x = 0
    y = 0
    k = 0
    r = 0

    WHILE r<=M AND k<Crunch
       xk = x*x - y*y + i
        y = 2*x*y + j
        x = xk
        k = k+1
        r = x*x + y*y
    WEND
RETURN

Select.Color:
    IF k=10 OR k=12 OR k=14 OR k=16 OR k=18 THEN
      COLOR 2
    ELSEIF k=11 OR k=13 OR k=15 OR k=17 THEN
      COLOR 3
    ELSEIF k>18 AND k<26 THEN
      COLOR 1
    ELSEIF k>25 AND k<70 THEN
      COLOR 0
    ELSEIF k>69 AND k<500 THEN
      COLOR 3
    ELSE
      COLOR 2
    END IF
RETURN
```

Listing Two
Program example in **TRUE BASIC**

```
let xmin = -0.18
let xmax = -0.14
let ymin =  1.02
let ymax =  1.05
let dx = (xmax-xmin)/639
let dy = (ymax-ymin)/199

set window xmin, xmax, ymin, ymax

let Crunch = 500
let M = 4

for j=ymin to ymax+dy/2 step dy
    for i=xmin to xmax+dx/2 step dx

        call Calculate
        call Select_Color
        plot points: i,j

    next i
next j

sub Calculate
        let x=0
        let y=0
        let k=0
        let xk=0
        let r=0

        do while (r<M and k<Crunch)
           let xk = x*x - y*y +i
           let y = 2*x*y + j
           let x = xk
           let k = k+1
           let r = x*x + y*y
        loop
end sub

sub Select_Color
        select case k
              case 10, 12, 14, 16, 18
                   set color 2
              case 11, 13, 15, 17
                   set color 3
```

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```
            case 19  to 25
                 set color 1
            case 26 to 69
                 set color 0
            case 70 to 499
                 set color 3
            case 500
                 set color 2
        end select
end sub

end
```

Listing Three
Program example in **C**

Two files called Fractal_C.c and Fractal_C.h must both be in current directory to compile. Using Lattice C, ver 4.0, put both files in ram: and type the following:

```
cd ram:
lc -Lm Fractal
```
(standard ieee floating point library program execution 4 hours, 45 minutes)

or

```
cd ram:
lc -f -Lf Fractal
```
(fast ieee floating point library program execution 2 hours, 35 minutes)

```
/*
Fractal_C.c  */

#include "Fractal_C.h"

struct XYScale
{
   float xmin;
   float ymin;
   float xmax;
   float ymax;
};

struct XYScale s;
int crunch, m, k;
float i, j, dx, dy;

VOID main()
{

   VOID make_display(), stop_program(), calculate(),
select_color();
   USHORT fx(), fy();

   make_display();

   s.xmin = -0.18;
   s.xmax = -0.14;
   s.ymin = 1.02;
   s.ymax = 1.05;
   dx = (s.xmax-s.xmin)/631;
   dy = (s.ymax-s.ymin)/186;

   crunch = 500;
   m      = 4;

   for( j=s.ymin; j<=s.ymax+dy/2; j+=dy )
   {
      for( i=s.xmin; i<=s.xmax+dx/2; i+=dx )
      {
         calculate();
         select_color();

         WritePixel(rp,fx(i),fy(j));

         if PRESS_BUTTON
            stop_program();
      }
   }

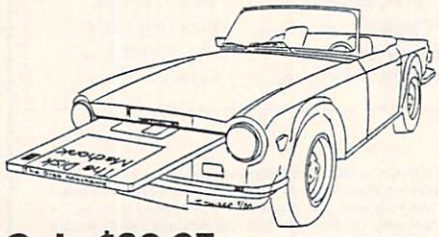
   while(1)
   {
      if PRESS_BUTTON
          stop_program();
   }
}

VOID calculate()
{
   float x, y, r, xk;
   x = 0;
   y = 0;
   k = 0;
   r = 0;
```

(continued)

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WordPerfect	4:42	12.36	5.37	130%
SuperBase	3:37	19.39	9.66	100%
data	1:43	14.30	4.68	205%
archives	3:40	28.43	9.52	299%

* Times given are the average of three runs on a standard A2000 internal floppy drive. The TuneUp time is the time required to process the disk (in minutes and seconds). The BEFORE and AFTER times are the time (in seconds) required to get a directory of the disk. The more use a disk has had, the better the improvement!

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```
   while(r<=m && k<crunch)
   {
      xk = x*x - y*y +i;
       y = 2*x*y +j;
       x = xk;
       k++;
       r = x*x + y*y;
   }
}

VOID select_color()
{
   if (k==10 || k==12 || k==14 || k==16 || k==18)
      SetAPen(rp,2);
   else if(k==11 || k==13 || k==15 || k==17)
      SetAPen(rp,3);
   else if(k>18 && k<26)
      SetAPen(rp,1);
   else if(k>25 && k<70)
      SetAPen(rp,0);
   else if(k>69 && k<500)
      SetAPen(rp,3);
   else SetAPen(rp,2);
}
/*  scale functions  */
USHORT fx(x)
float x;
{
   if(x>s.xmin && x<s.xmax)
      return((USHORT)(((x-s.xmin)+dx/2)/dx));
   else if(x<=s.xmin)
      return((USHORT)0);
   else return((USHORT)631);
}

USHORT fy(y)
float y;
{
   if(y>s.ymin && y<s.ymax)
      return((USHORT)(186-(USHORT)(((y-s.ymin)+dy/2)/dy)));
   else if(y<=s.ymin)
      return((USHORT)186);
   else return((USHORT)0);
}
```

Listing of Fractal_C.h:

```
/*
Fractal_C.h  */

#include <intuition/intuition.h>
#include <math.h>
#define PRESS_BUTTON ((imesg=(struct IntuiMessage
*)(GetMsg(window->UserPort)))!=NULL)

struct IntuitionBase *IntuitionBase;
struct GfxBase *GfxBase;
struct Library *DiskfontBase;
/* s  */
struct Window *window;
struct RastPort *rp;          /*  windessage *imesg;
UBYTE *mesg;

VOID make_display()
{
    VOID open_intuitiophics(), get_window();

    open_intuition();
    open_graphics();
    get_dow();
}

VOID open_intuition()
{
    IntuitionBase=(struct IntuitionBas*)
         OpenLibrary("intuition.library",LIBRARY_VERSION);
    if(Intuit    {
        printf("I can't open intuition library\n");
        exit(FALSExBase *) OpenLibrary("graphics.library",
              LIBRARY_VERSION);
    if (GfxBase == NULL)
    {
        printf("I can't open graphics library !!\n");
VOID get_window()
{
    struct NewWindow window_spec;
    window_spec.Lefec.TopEdge=0;
    window_spec.Width=640;
    window_spec.Height=200;
    window_spec.DetailPen=0;
    window_spec.BlockPen=1;
    window_spec.Title="Mandel_spec.IDCMPFlags=CLOSEWINDOW;
    window_spec.Type=WBENCHSCREEN;
    window_spec.FirstGadget=NULL;
    window_spec.CheckMark=NULL;
    window_spec.Screen=NULL;
    window_spec.BitMap=NULL;
    window_spec.MinWidth=0;
    window_spec.MinHeight=0;
    window_spec.MaxWidth=0;
    window_spec.MaxHeight=0;
    window = (struct Window *) OpenWindow(&window_spec);
    if (window == NULL)
    {
       printf("I can't open window !!\n");
       exit(FALSE);
    }
    rp = window->RPort;
}
VOID stop_program()
{
    CloseWindow(window);
    CloseLibrary(GfxBase);
    CloseLibrary(IntuitionBase);
    exit(FALSE);
}
```

•AC•

DOUBLE Play

Programming Dual Playfield Mode in **AmigaBASIC**

by Robert D'Asto

The Amiga possesses several special display modes which are not directly supported by AmigaBASIC. These modes should not be confused with the resolution options (320 X 200, 640 X 200, etc) which are easily selected directly in BASIC via the SCREEN statement. Display modes are something else entirely. They're special configurations of display system elements which put the Amiga into graphics display "overdrive" and thus play an important part in what makes an Amiga an Amiga.

Before going any further, though, the phrase "directly supported by AmigaBASIC" deserves a definition. There are many Amiga features which have been described in magazine articles and books as "not supported" by this language, possibly giving the impression that a programmer has very little real control of the Amiga via BASIC. This isn't true. The phrase "not supported by AmigaBASIC" simply means: you can't do it entirely with BASIC keywords, so you'll have to use some library routines and/or some PEEKs and POKEs to pull it off. That's all it really means.

Any language which can access the ROM Kernel Routines can accomplish nearly anything of which the Amiga is capable. That, of course, includes AmigaBASIC. The C language, strictly speaking, does not "directly support" the rendering of even a single pixel on the screen, yet it is a principle graphics development tool for the Amiga. The C programmer uses the same library routines available to BASIC, as well as, other supporting files and macros to create graphic effects. The bottom line is: if the Amiga can do it, it can almost certainly be programmed with AmigaBASIC.

What is Dual Playfield?

Dual Playfield is the simultaneous presentation of two independent screen displays, "one on top of the other". Each is an independent display which can be scrolled, drawn upon or otherwise graphically adorned just like any normal Amiga screen. Each can also have different palettes, draw modes or any other available rendering option. It's as if one display were on a sheet of glass with another, independently controlled display beneath it. Objects rendered in both displays (called playfields) are opaque, while the background of the upper Playfield is transparent. The only limitation is that the two playfields can use no more than a total of six bitplanes.

There is another display technique which is similar to Dual Playfield called Dual BitMap. The two should not be confused.

There is a description and code listing for a Dual BitMap given in the book *Amiga Tricks and Tips* from Abacus (Recommended reading, by the way) which you may have seen, but the two techniques are quite different, both from a programming standpoint and in terms of the visual effect created. A Dual BitMap arrangement combines two displays into one, thus the objects rendered in each have a translucent, "double exposure" appearance. You can "see through" the objects in the upper display and view those on the bottom. This is because you're not seeing two independent displays at all, but rather a single display of two images, one "superimposed" on the other. It's a useful effect and definitely worth adding to your special effects repertoire...but it's not a true Dual Playfield Mode display.

One example application of Dual Playfield might be a representation of a cockpit and Heads Up Display (HUD) in a flight simulation or similar game. The rolling and pitching terrain viewed through the "canopy" would be completely independent of the cockpit instruments, controls and targeting devices. Each could have separate palettes, animated objects, renderings and so on. There are, of course, many other possible applications of Dual Playfield displays limited only by the imaginations of clever programmers.

Documentation for programming Dual Playfield with the C language (and possibly a few others) has been published previously but, to my knowledge, this is the first time a programming template for achieving Dual Playfield mode with AmigaBASIC has seen the light of day. Perhaps this will help dispel any uninformed ideas that BASIC can't be considered a "serious" language for the Amiga.

The source code listing DUALPF_Demo at the end of this article produces a true Dual Playfield mode and a simple demonstration of its characteristics. In this case, Playfield One is a solid black backdrop with a text display and "beneath" it is Playfield Two which is something quite different. Using the mouse, we can erase the top playfield as if we were scraping paint off the screen and view the second playfield display underneath. The listing contains two subroutines, one to enable DUALPF and one to return to the default display configuration. These can be SAVEd in ASCII format and later MERGEd for use in your own program applications.

Depending upon your familiarity with the details of the Amiga operating system, the remarks provided in the code may or may not be of much help in clarifying the process of enabling this mode. It isn't possible in a single magazine article to give a complete description of all the elements involved, but simple definitions of key terms are provided, as are suggested references for further study. Of course, all that's required to see this particular demo run is to type in the code listing as given,

(continued)

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but some knowledge of the ROM Kernel routines will also be necessary to create your own applications of Dual Playfield. Since this latter information is now widely available to BASIC programmers in many books and articles, the coverage of this material will be brief and in no way complete. Again, suggested references are provided.

DEFINITIONS

The following terms are used in the remarks for DUALPF_Demo and this article and deserve further clarification:

DUALPF: Dual Playfield Mode.

STRUCTURE: an exact sequence of data storage units kept in memory. Each unit of data within a structure is usually 1 or 2 or 4 bytes in length and holds an assigned value. It's a tidy way to keep track of a group of data of different lengths. The Amiga operating system uses lots of structures. For more information about structures for BASIC programmers, see the Amazing Computing article Industrial Strength Menus (A/C 4.1), written by some obscure hacker whose name escapes me.

RASTPORT STRUCTURE: an important structure approximately 100 bytes long generated by the operating system. It contains all the data the system needs to render graphics in a window: current foreground and background colors, draw mode, area fill pattern and many other parameters. It also contains the locations in RAM of other, related structures. When a ROM Kernel graphics routine is used, it usually wants to know the memory address of a RastPort Structure. The routine needs the data in the RastPort structure to perform its task.

WINDOW STRUCTURE: Each window has its own Window Structure which contains data concerning all of its parameters and the memory addresses of related structures. Since it defines every aspect of the window, you can bring about changes in the window by changing certain parts of the Window Structure.

STRUCTURE POINTER: a variable or constant with a value equal to the memory address of the beginning of a structure. The AmigaBASIC functions WINDOW(7) &WINDOW(8) return pointers to the current Window and RastPort Structures. There are ROM routines which return pointers to other structures.

VIEW and **VIEWPORT STRUCTURES**: these are structures containing data which allows the system to keep track of elements that make up the display as a whole.

COPPER LIST: the copper is the graphics coprocessor chip. It outputs coded instructions to the monitor, defining what is to be displayed. This list of instructions is called the Copper List.

BITMAP: All the bitplanes used in a display. For example, if you were to create a screen with a depth of three, all three of these bitplanes would comprise the bitmap. It is the area in RAM occupied by the bitplanes. There is usually only one bitmap, but in DUALPF Mode there are two.

RASTER: In this context, raster is another name for a bitmap. The term raster bitmap is also sometimes used. A raster is a bitmap is a raster bitmap.

BITMAP STRUCTURE: a structure that contains information about the bitmap. It contains the memory addresses of all the bitplanes that make up a bitmap, the dimensions of the bitplanes and a few other details.

RASINFO STRUCTURE: a small structure (12 bytes) which contains the memory address of another RasInfo structure (if any), the address of the BitMap structure and data about x and y scroll offsets, if any.

Working In DUALPF With AmigaBASIC

There's more to programming with DUALPF then simply "turning it on". To take advantage of the unique characteristics of this mode, the ROM Kernel graphics library routines must be used for at least some, if not all, of the graphics rendering. The reason is AmigaBASIC does not recognize a Dual Playfield display and provides no direct means of switching graphics output from one playfield to another. It is possible to program DUALPF in such a way, however, that AmigaBASIC can recognize one of the playfields and all graphics rendering keywords will work normally within it. This would apply to Playfield One or the "top" playfield in the listing provided. Playfield Two requires the graphics library routines for all graphics work and is the reason that some familiarity with these system primitives is needed when working with this type of display. In short, the AmigaBASIC graphics keywords (CIRCLE, LINE, PRINT, etc) will work with Playfield One only and the

ROM Kernel routines will work with both playfields in this particular implementation of DUALPF. A word of caution, though: There are other, more complex ways of programming this mode and the BASIC graphics keywords may not work at all in some of them.

The reason has to do with how the Amiga creates and maintains DUALPF. Though Playfield One is described as being "on top of" Playfield Two, this is not literally true. A monitor really has only one "level" of depth. The Amiga simply creates two separate display systems within RAM, combines their output and displays the result. When the programmer wants to render something in one of the Playfields, he needs a way to specify in which display system he wants it to appear. This is where the RastPort Structure, defined above, comes in.

The RastPort Structure is like a graphics control panel for a display system. It contains all the possible parameter choices, as well as, the addresses of other structures which contain other important data necessary to the system for graphics rendering. For example, when we want to change the current foreground and background colors, we use the COLOR statement like this: COLOR 2,1. AmigaBASIC then "plugs" these values into the correct memory locations within the RastPort Structure which are known to contain the current foreground and background colors. All rendering commands check these locations within the RastPort Structure before performing their tasks, so anything drawn on the screen after the above COLOR statement will be rendered in the colors specified.

Since each Playfield has its own RastPort Structure containing its current graphics rendering options, we can draw in either display simply by specifying one of the RastPort Structures. This is done by creating two RastPort Structures, assigning the memory addresses of both to two different variables, and then passing one or the other of these pointers to the desired routine. AmigaBASIC's graphics rendering keywords have no provision for specifying a RastPort Structure, since they are intended for use only with a conventional, one playfield display. This is why these keywords will only work in Playfield One. The graphics library routines, however, do provide for a choice of RastPorts and is the reason they will function in either playfield.

Put very simply, a programmer creates a DUALPF mode as follows:

1. Create two separate BitMaps and BitMap structures.

2. Create two RasInfo structures and two RastPort structures.

3. Create one ViewPort structure and one View structure.

4. Set the DUALPF parameter in both the View and ViewPort structures.

5. Define the two Copper Lists, combine and load them.

How does an AmigaBASIC programmer do these things? It's not as difficult as it sounds. The AmigaBASIC interpreter and the Amiga operating system will do half of it for you. The rest is mostly done with ROM Kernel routines.

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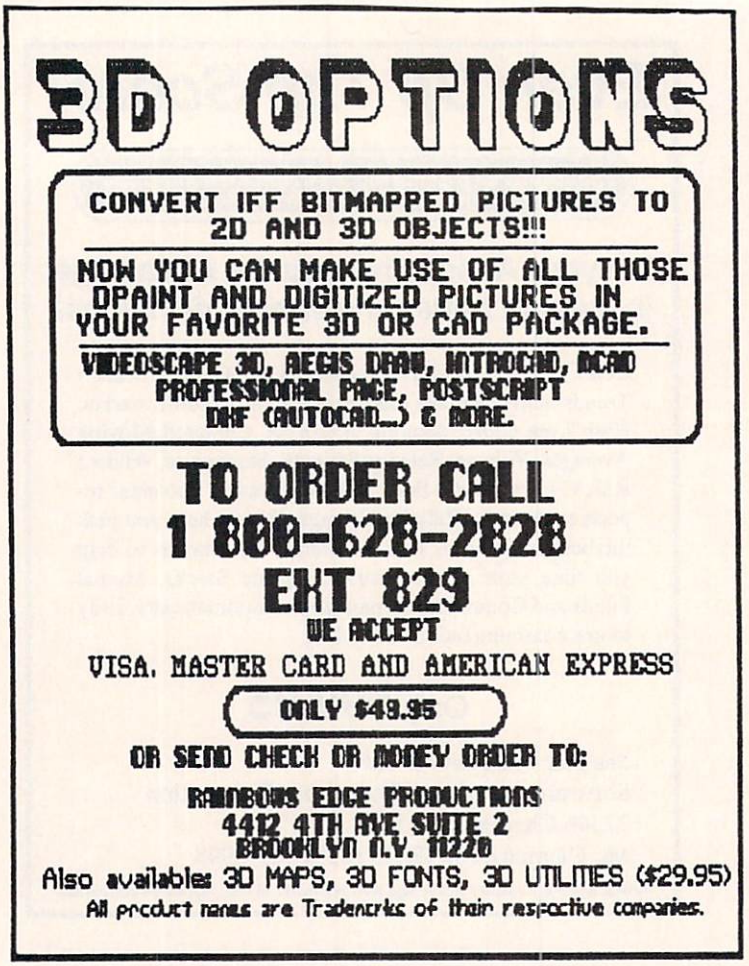
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The remarks in the code listing identify where these steps are done and are described in more detail below. As mentioned earlier, there's a lot more to know about the Amiga operating system than can be given here. One particular reference I recommend is Amiga Programmers Handbook by Eugene P. Mortimore, published by Sybex. The listing given here is, loosely, a "translation" to AmigaBASIC of the C programming template provided in the above reference for setting up a DUALPF display. I say "loosely" because, in adapting it to the interpreter, I've taken advantage of some of AmigaBASIC's high level functions to make the source code more compact. These "short cuts" are covered in more detail in the text below.

Now onward and downward, into the darkest recesses of terra Amiga, for a cram course in DUALPF programming. We'll begin by expanding upon the five steps given above which are contained within the DUALPF.ON subroutine in the code listing. You'll notice that the sequence of the source code doesn't exactly parallel the sequence of explanations given here. That was unavoidable, due to the structure of AmigaBASIC. The remarks within the source code designate what's being done at each point to help you follow the procedure.

For step one above we only need to create one each of the items mentioned. This is because every time we run a BASIC program, whether we create a custom SCREEN/WINDOW combination or not, the operating system creates a display BitMap for it, as well as, all the other necessary display structures. We need only create a second BitMap and BitMap Structure for the second playfield.

(continued)



Okay, so how do we do that? The first seven lines of code (not counting remarks) in the DUALPF.ON routine show how this is done. The key routines used are the exec function AllocMem and the graphics routine AllocRaster.

First I'll describe AllocMem. AllocMem is an exec library routine used to set aside an area of memory for a particular purpose. In this case the allocated memory area will be used to hold a BitMap Structure. Its syntax is:

```
Addr&=AllocMem&(bytesize,opt&)
```

where Addr& is any long integer variable supplied by the programmer, bytesize is the length of the desired block of memory and opt& is a variable which holds a value corresponding to one of several options. At this stage of the game I suggest assigning opt& the value of 65537 (2^0+2^16) when creating structures. This will tell AllocMem to provide a memory block which is cleared of any garbage and will not shift around during program execution. There are other options but a discussion of them would not be appropriate to the subject at hand. We simply tell AllocMem how much memory we need via the bytesize variable and it does the rest, assigning the address of the allocated memory to our Addr& variable. In the case of a BitMap Structure, 40 bytes will do the trick. We can now POKE anything we want into this area of memory safely, using Addr& as a point of reference.

The graphics library routine AllocRaster is similar to AllocMem, but it's used for the specialized purpose of allocating memory for BitMaps, one bitplane at a time. The syntax is:

```
BitplanePointer&=AllocRaster& (width,height)
```

where width and height are the dimensions of the desired bitplane in pixels. Once the routine executes, it will assign the bitplane's address to the long integer variable BitplanePointer&. In our listing, we create three bitplanes in a FOR/NEXT loop and store the addresses of each in a long integer array of three elements called BitMapPlanes&(). These addresses are POKEd into the BitMap Structure in three lines of code further down in the DUALPF.ON routine. Both AllocRaster and AllocMem are routines which return long integer values so must be declared as such with DECLARE FUNCTION statements, which appear at the top of the code listing.

Now, for step two. Create the second RasInfo Structure with AllocMem in a manner similar to the above. We need 12 bytes of memory to hold this structure, but we allocate 16 because AllocMem only works with multiples of eight bytes. The address of the second BitMap Structure can then be POKEed into it. To make the second RastPort Structure we first allocate 104 bytes with AllocMem then use the graphics routine InitRastPort to initialize it. To initialize a structure means to fill in default or starting parameters. The InitRastPort routine requires only the address of our new RastPort to do this job.

We won't have to do step three at all. The View and ViewPort Structures are also automatically created for any BASIC program and only one of each is required for DUALPF. We need only locate the memory addresses of these structures so that we can POKE in a particular value in a particular spot within each structure (more on this below). This will take care of step four. This value will signal the system that Dual Playfield mode is in effect. Finding the addresses of the View and ViewPort Structures is done with two intuition library routines which were designed for this purpose. The routines are called ViewAddress and ViewPortAddress and are very easy to use. The syntax is as follows:

```
V&=ViewAddress&()
```

VP&=ViewPortAddress&(WINDOW(7)) where "V&" and "VP&" are long integer variables which will be assigned the addresses of the View and ViewPort Structures respectively when the routines execute. As you can see, the ViewAddress routine needs no parameters at all and the ViewPortAddress routine needs only the address of the current Window Structure which is provided by the BASIC WINDOW(7) function. Both these routines also return long integer values and require DECLARE FUNCTION statements.

The value mentioned above, which must be POKEd into these two structures to signal that DUALPF, is in effect is equal to the hexadecimal number &H400 (decimal 128) and must be POKEd to the memory location 32 bytes from the beginning of the ViewPort Structure and 16 bytes from the beginning of the View Structure. This can be accomplished with:

```
POKEW VP& + 32, &H400

POKEW V& + 16, &H400
```

The system will now recognize the Dual Playfield mode display.

Scrolling all or part of a display is done with the ScrollRaster routine. Its syntax is:

ScrollRaster RP&,dx,dy,xmin,ymin,xmax,ymax The variables dx and dy represent the distance (in pixels) that the rectangle should move. Positive dx values cause movement to the left and positive dy values cause upward movement. Negative values cause movement in the opposite directions. The last four variables define the rectangle to be moved in the same manner as the RectFill routine. A single call to ScrollRaster will cause the specified rectangular area to immediately jump to its new location. Smooth scrolling is accomplished with a FOR/NEXT loop in which the dx and/or dy values are incremented. Simultaneous scrolling on both playfields is done with a single FOR/NEXT loop as above, but containing two ScrollRaster statements, one for each playfield. For example:

```
FOR x%=0 TO 15

ScrollRaster RP.1&,c1*x%,0,0,0,311,186

ScrollRaster RP.2&,x%,0,0,0,315,197
```

NEXT x% where RP.1& and RP.2& are the addresses of the RastPort Structures for Playfields One and Two respectively. This loop will cause the two playfields to scroll in opposite horizontal directions at the same time.

Printing text on the screen is done with the Text function. This is done as follows:

Text RP&,StringPointer,StringLength where StringPointer is the memory address of the beginning of the string and StringLength is its length in bytes. There are two AmigaBASIC functions which will provide this address and length information. They are SADD and LEN. Here is one method of using the Text function:

```
t$="Hello, you rascal."
```

Text RP&,SADD(t$),LEN(t$) One advantage in using Text over PRINT is that it executes much faster and once you try it you may just want to use it all the time, especially with text intensive applications. It can fill an entire screen in a blink. Unlike PRINT, however, subsequent calls to Text will not begin printing on the next line. They will simply keep on printing the additional text strings on the same line, off the right edge of the screen. A simple way around this is to insert a PRINT statement between each of your Text calls. This will act as a carriage return for Text and it even works in Dual Playfield mode for both playfields.

As stated earlier, there are many other graphics rendering routines available in the graphics library—far too many to describe here. Quite a few of them have no comparable equivalents in AmigaBASIC, which makes learning and experimenting with them a real treat. Get hold of a reference book and experiment away.

I should also point out that the screen coordinates of the two playfields rendered with the DUALPF_Demo listing are not quite the same. That is, pixels rendered at the same coordinates on both displays will not appear in the same position on the screen. The pixel in Playfield Two will be 11 pixels higher and 4 pixels to the left of the pixel in Playfield One. The reason is Playfield Two has no title bar or border as does Playfield One. We could provide the second playfield with these things, but the code required would multiply the complexity substantially.

It's far easier to simply provide the appropriate offsets in the source code coordinate statements. The Playfield.1 routine in the listing shows an example of this. Random screen coordinates are produced by the RND function and then adjusted by 4 and 11 for the x and y positions respectively. Omitting this adjustment would cause the bottom display to "leak out" around the edges of the top display and spoil the effect.

Do take your time when entering the code listing and be sure to save it before trying it out. A typo, especially in the DUALPF.ON routine, can easily irk the guru. Another possible pitfall is an Out Of Memory error caused by running the DUALPF.ON routine too many times without DUALPF.OFF while experimenting or debugging. In either case you'll have to reboot.

If you get bored watching my little demo you can, of course, create your own applications of Dual Playfield simply by changing the Playfield.1 and Playfield.2 routines in the code listing. Give it a try. You must be an adventurous sort or you wouldn't have gotten to the end of this article, right?

Listing One
DUALPF_Demo

```
'* * * * * * * * * * * * * * * * * *
'*                                   *
'*          DUALPF_Demo              *
'*                                   *
'*          source code              *
'*              by                   *
'*         Robert D'Asto             *
'*                                   *
'* An example of Dual Playfield      *
'*       mode in AmigaBASIC          *
'*                                   *
'* * * * * * * * * * * * * * * * * *

ON BREAK GOSUB EndIt:BREAK ON

DECLARE FUNCTION AllocRaster&() LIBRARY
DECLARE FUNCTION AllocMem&() LIBRARY
DECLARE FUNCTION ViewPortAddress&() LIBRARY
DECLARE FUNCTION ViewAddress&() LIBRARY

LIBRARY "graphics.library"
LIBRARY "exec.library"
LIBRARY "intuition.library"

SCREEN 1,320,200,3,1
WINDOW 2,"Dual Playfield",,0,1

DEFINT n,p,t,x,y:RANDOMIZE TIMER

MENU 1,0,1,"To exit press both Ctrl and C keys"+SPACE$(5)

GOSUB DUALPF.ON

Playfield.1:
  PAINT (10,10),2
  COLOR 1,2
  PRINT
  PRINT "This is Playfield 1"
  PRINT
  PRINT "Move mouse while holding"
  PRINT "down left button to see"
  PRINT "Playfield 2"
  COLOR 3,2
  PRINT
  PRINT "To exit press Ctrl/C"

ON MOUSE GOSUB EraseIt:MOUSE ON

Playfield.2:
  pennum=1
  WHILE -1
    IF pennum > 7 THEN pennum=1
    CALL SetAPen (RastPort.2&,pennum)
    xmin=RND*311+4:ymin=RND*186+11
    xmax=RND*311+4:ymax=RND*186+11
```

(continued)

```
    IF xmin > xmax THEN SWAP xmin,xmax
    IF ymin > ymax THEN SWAP ymin,ymax
    CALL RectFill (RastPort.2&,xmin,ymin,xmax,ymax)
    pennum=pennum+1
  WEND

EndIt:
  GOSUB DUALPF.OFF
  MOUSE OFF
  SCREEN CLOSE 1
  MENU RESET
  END

DUALPF.ON:
    'array to store bitplane addresses
  DIM BitMapPlanes&(2)
    'store address of 1st BitMap struct
  BitMap.1&=PEEKL(WINDOW(8)+4)
    'allocate 2nd BitMap struct
  opt&=2^0+2^16
  BitMap.2&=AllocMem&(40,opt&)
    'create 2nd set of 3 bitplanes
  FOR n = 0 TO 2
   BitMapPlanes&(n)=AllocRaster&(320,200)
  NEXT n
    'store address of ViewPort struct
  VP&=ViewPortAddress&(WINDOW(7))
    'store address of 1st RasInfo struct
  RasInfo.1&=PEEKL(VP&+36)
    'allocate 2nd RasInfo struct
  RasInfo.2&=AllocMem&(16,opt&)
    'store address of 1st RastPort struct
  RastPort.1&=WINDOW(8)
    'allocate 2nd RastPort struct
  RastPort.2&=AllocMem&(104,opt&)
    'initialize 2nd BitMap struct
  CALL InitBitMap(BitMap.2&,3,320,200)
  POKEL BitMap.2&+8,BitMapPlanes&(0)
  POKEL BitMap.2&+12,BitMapPlanes&(1)
  POKEL BitMap.2&+16,BitMapPlanes&(2)
    'initialize 2nd RastPort struct
  CALL InitRastPort(RastPort.2&)
  POKEL RastPort.2&+4,BitMap.2&
    'complete the 2 RasInfo structs
  POKEL RasInfo.1&,RasInfo.2&
  POKEL RasInfo.2&+4,BitMap.2&
    'save default modes parameter
  ViewPortModes%=PEEKW(VP&+32)
    'provide DUALPF parameter
  POKEW VP&+32,&H400
    'store address of ViewPort struct
  View&=ViewAddress&
    'save its default modes parameter
  ViewModes%=PEEKW(View&+16)
    'provide it with DUALPF parameter
  POKEW View&+16,&H400
    'handle the copper lists
  CALL MakeVPort(View&,VP&)
  CALL MrgCop(View&)
  CALL LoadView(View&)
    'clear the decks
  CALL SetRast(RastPort.1&,0)
  CALL SetRast(RastPort.2&,0)
RETURN

DUALPF.OFF:
    'free up 2nd BitMap struct
  CALL FreeMem(BitMap.2&,40)
    'free up the 2nd BitMap
  FOR n=0 TO 2
    CALL FreeRaster(BitMapPlanes&(n),320,200)
  NEXT n
    'free up RasInfo and RastPort structs
  CALL FreeMem(RasInfo.2&,16)
  CALL FreeMem(RastPort.2&,104)
    'reset default parameters
  POKEW VP&+32,ViewPortModes%
  POKEW View&+16,ViewModes%
    'restore default RasInfo struct
  POKEL RasInfo.1&,0
    'let's be squeaky clean
  ERASE BitMapPlanes&
  LIBRARY CLOSE
RETURN

EraseIt:
  Test=MOUSE(0)
  WHILE MOUSE(0)<>0
  x=MOUSE(1):y=MOUSE(2)
  LINE (x,y)-(x+5,y+5),0,bf
  WEND
  RETURN
```

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Step five is done with three graphics library routines designed for this purpose. These routines are: MakeVPort, MrgCop and LoadView. They require, as parameters, the above addresses of the View and ViewPort Structures as follows:

```
CALL MakeVPort(V&,VP&)

CALL MrgCop(V&)

CALL LoadView(V&) That's all there is to it.
```

The second subroutine in the DUALPF listing is DUALPF.OFF, which also deserves some explanation. Whenever a program delves into the ROM Kernel routines, system structures, or in any way mucks about with the Amiga's innards, it's always a good idea to ensure that it "cleans up" after itself before exiting. That is, any allocated memory should be deallocated (freed up) and any changes made to the operating system should be returned to default conditions. Normally, when programming in AmigaBASIC, this isn't a major concern so this may be a new concept to some. As long as the program closes any file previously opened, AmigaBASIC usually poses little liability in this regard. However, when we use ROM Kernel memory allocation routines and POKE around in system structures, the changes created don't go away just because the program ends. Any memory allocated with AllocMem, AllocRaster or any similar routine will stay allocated until it is specifically deallocated or a reboot occurs. This means the memory is "tied up" and is not available for use by other programs. Rerunning the same program which allocates but does not deallocate memory will use more and more memory each time the program is run.

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This is called a "memory leak" and can cause a system crash if continued long enough. This is especially important when the program allocates memory for graphics purposes such as bitplanes. With the Amiga's current hardware configuration only the first 512K of RAM (called chip RAM) can be used for this purpose no matter how much expansion RAM is mounted. A single, low res bitplane consumes 8K of this RAM. In our DUALPF listing, three of these bitplanes (24K) are allocated. If this RAM wasn't deallocated upon exit, running the program 10 times would eat up nearly half of the available chip RAM. A few more runs and the system could crash.

Leaving the system in Dual Playfield mode could also cause some strange effects on any subsequent runs of other programs, possibly bringing about a mysterious visit from the guru for an unsuspecting user. Definitely not the way to impress your friends with your programming prowess.

The DUALPF.OFF subroutine handles this situation by freeing up all allocated memory and returning the system to its default single playfield mode. The exec library routine FreeMem is used to free up the memory blocks previously allocated with AllocMem. The graphics library routine FreeRaster is used to deallocate the bitplane RAM previously allocated with AllocRaster. The syntax for each is:

```
FreeMem address&,bytes
```

FreeRaster address&,width,height The variable address& is the memory address of the beginning of the memory block (or bitplane) to be returned to the status of free memory. The bytes parameter is the length of the block and width/height are the dimensions of the bitplane in pixels. In the DUALPF.OFF subroutine a loop is used with FreeRaster to free up all three bitplanes.

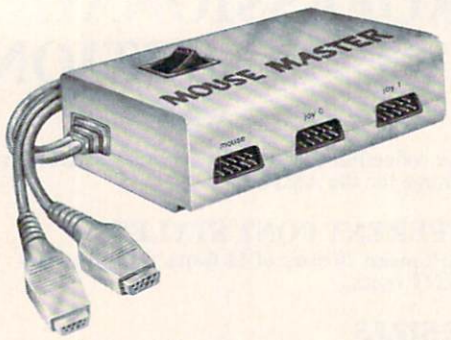
The POKEW and POKEL statements in the DUALPF.OFF routine are there to restore the ViewPort, View and RasInfo Structures to their default settings. The variables ViewPort-Modes% and ViewModes% were assigned these default values earlier in the DUALPF.ON routine and these values are now returned to the appropriate positions within the two structures.

The ROM Graphics Routines

As mentioned earlier, a familiarity with at last some of the graphics library routines is required to program in DUALPF. I'm assuming the reader is at least somewhat familiar with opening libraries and calling library routines with AmigaBASIC. If not, some references I recommend are *Advanced AmigaBASIC* from Compute! Books and *Amiga Tricks and Tips* from Abacus, as well as, numerous Amazing Computing articles on the subject.

As for the routines themselves I'll give a brief description of some which are frequently used and which parallel AmigaBASIC's graphics keywords. Some of these are used in the DUALPF_Demo listing and the rest are for your own experimentation. A more complete documentation of these routines can be found in the *ROM Kernel Reference Manual: Libraries and Devices* from Addison-Wesley, the *Amiga Programmer's Handbook* mentioned earlier and *Inside Amiga Graphics* from Compute! Books, to name three.

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In the following descriptions "RP&" refers to a long integer variable which contains the address of a RastPort Structure. Generally speaking, this pointer can be initialized using the WINDOW(8) function as follows:

RP&=WINDOW(8) This loads the address of the current RastPort Structure into the variable "RP&".

In the following examples the syntax shown for calling the subroutines employs the "non CALL" option, that is, the CALL keyword and parentheses surrounding parameters are omitted. The source code listing uses the alternate syntax which includes the CALL keyword and parentheses so these routines can be more easily spotted within the code and also to demonstrate both methods. All of the following routines reside in the graphics library.

One graphics rendering routine used in the DUALPF_Demo listing is RectFill. This routine renders a filled rectangle in the current foreground color. Its syntax is:

RectFill RP&,xmin,ymin,xmax,ymax where xmin/ymin are the coordinates of the upper left corner and xmax/ymax are the lower right. It's very similar to the LINE keyword with the "bf" option.

Setting foreground and background colors is done with the SetAPen and SetBPen routines respectively. The syntax is:

```
SetAPen RP&,colornum%
```

SetBPen RP&,colornum% where colornum% is the number of the desired palette color.

Changing palette color values in AmigaBASIC is done with PALETTE statements. The graphics library routine for this operation is called SetRGB4 and is used as follows:

SetRGB4 VP&,n,red,green,blue The VP& variable is the address of a ViewPort Structure. See the explanation above of the ViewPortAddress function for details on how to get this address. The n variable and the red, green and blue parameters are the same as those used in the PALETTE statement. They represent the color number being defined and the values that represent the intensity of the three primary colors that comprise it. There is one difference, though. With the PALETTE statement we use values ranging from 0 to 1 to describe the color intensities. With the SetRGB4 routine we use integers ranging from 0 to 15.

Another rendering routine used in the listing is SetRast. This routine sets an entire BitMap (raster) to a specified color. It's used as follows:

SetRast RP&,colornum% This routine can be used as a replacement for the CLS keyword by specifying the background color (0) for colornum%. In the listing it's used after the second BitMap is created to clear any "garbage" from the newly created raster.

Drawing lines is done with two routines: Move and Draw. Move is used to locate the drawing curser at a particular screen location without drawing anything on the screen. Draw is then used to actually draw the line. For example, to draw a triangle;

```
Move RP&,100,10

Draw RP&,50,50
```

Draw RP&,150,50 The numbers are simply x/y coordinates. To draw another, separate object after the above triangle the next line would be a Move statement and then more Draw statements would follow.

Drawing a circle or ellipse is done with DrawEllipse. The syntax is:

DrawEllipse RP&,x,y,horiz.radius,vert.radius where x and y are the screen coordinates for the center of the ellipse and the last two parameters are the screen width and height of the ellipse in pixels. The color used for both the DrawEllipse and Draw routines is determined by a prior call to the SetAPen routine.

The graphics library equivalent of the PSET command is WritePixel. Its syntax is:

WritePixel RP&,x,y The color of the pixel which is set by WritePixel would also be determined by a prior call to SetAPen.

The BASIC function POINT, which returns the palette number of a particular pixel, has a counterpart in ReadPixel. It's used like this:

pennum%=ReadPixel(RP&,x,y) As you can see it's very similar to POINT.

C Notes from the C Group

Preprocessor Control Lines

by Stephen Kemp

In past articles I have included sample programs that used an important C construct, while offering only minor explanations of how they worked. These constructs are called preprocessor control lines (often referred to as preprocessor directives or compiler directives). If you have seen the source to a few C programs, you will probably recognize the items #include and #define. These two items, in one form or another, appear in almost every program. They are preprocessor directives. This month, I will try to explain the different types of preprocessor control lines in a little more detail.

As the name implies, preprocessor directives are "resolved" by the compiler before the remainder of the program is compiled. Preprocessor control lines fall into one of five general categories: token replacements, file inclusions, macros, condition compilations, and line controls. Each directive is indicated by the # sign, and followed by a key word. Unlike regular C statements, preprocessor control lines are not terminated by semicolons. They can also appear anywhere in a source file.

Line controls are probably the least frequently used preprocessor directive, so I will dispose of them right away. Line controls indicate to the compiler (usually for debugging purposes) which line number to generate, beginning with the next source line. You can also direct the compiler to change the source file name. The syntax of this directive is as follows:

```
#line constant "filename"
```

For the most part, line controls are used in diagnosing errors. Usually when a compiler generates an error, the error message contains the source filename and the line number in error. Using the #line directive, you can manipulate the messages generated by the compiler (hopefully leading to easier debugging). The constant represents the number you want the compiler to use, beginning with the next line. As mentioned, the filename parameter is optional. The name the compiler uses will not change if the filename parameter is omitted. The other categories of preprocessor directives are used more often than line controls.

Probably the most frequently used preprocessor control is the one for file inclusion. When the compiler encounters an include directive, the indicated file is "copied" into the source file and then compiled as part of the source. You may recall from my sample programs that the #includes were placed at the top of the source file, before the first executable statement. This is usually the best place for the statement because include files typically contain a number of standard definitions, structures, or external variable declarations required by the entire program. Compilers normally support two variations of the include directive.

```
#include "filename"

#include <filename>
```

Both statements will include the file indicated by the variable filename. The version in quotes will first search for the include file in the current directory (usually where the source file is). If the file cannot be found (and if supported by the compiler), a standard include directory will be searched. Version two, encased between < and >, searches for the file in the standard include directory. It will not look in the current directory. In both versions, if an include file cannot be found, an error message will be generated by the compiler. Include directive can also be nested, meaning that include files can name other include files.

Token replacement control lines can lead to a well-documented source code. They can also provide a standard reference to a constant used throughout a program that is controlled by a single line.

```
#define MAX 100
```

This statement says to "define" a token named MAX, the compiler will replace the token with the value 100. Making a definition like this means it can be used in other statements like this:

```
char  array_var[MAX];

for(i = 0; i < MAX;i++)
   array_var[i] = 100;
```

(continued)



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As you can see, the MAX token helps document the code by indicating when the maximum size of the array is in question. It can also be easily changed, should you decide that you need a different maximum value. Imagine having to search through an entire program for every occurrence of the specific value 100, and running the risk of changing a 100 that wasn't referring to that maximum. If you have a #define, all you have to do is change one line.

Undefined Tokens

Token definitions can also be "undefined". This is accomplished using the #undef directive. Undefining a token means the compiler will no longer recognize it. Using the previous example, we could turn off the previous definition with this statement:

```
#undef MAX
```

Macros are an extension of the token replacement directive. (Actually, many people refer to all preprocessor controls as macros.) A macro definition looks something like a function definition, only it is followed by another "statement" that the compiler uses as a replacement.

```
#define abs(var1)          (((var1) > 0)? (var1):-(var1))
#define copy(var1,var2)    strcpy((var2),(var1))
```

I will not pretend these are great macros that you should use, but they will suffice as a demonstration. The first definition creates a macro that accepts one variable. The compiler's preprocessor will substitute the "statement" following the definition whenever it encounters the macro. The second definition creates a macro that has two variables, and substitutes a call to a standard C function. Both demonstrate some important points about macro definitions that are worth noting.

First, the variable names can be anything that you want. I used the var syntax because it makes it convenient to distinguish between the variables in print. Variable names that you use in a macro are not as important as the macro name. This is because you won't see the variable names that you have used in the macro in your code. In fact, the variable names in a macro are tokens that will be replaced with the appropriate variable name used in the source code. Of course, you should still use names that enable you to understand the "results" of the macro.

Also, note that the macro does not care what data type the variables are. It is up to the programmer to ensure that the appropriate data types are passed to the macro. The resulting replacement string can rearrange the arguments, and use them any number of times. If you accidentally call the macro with too few parameters, the compiler will usually inform you of this error.

The next thing to note is that the macro's variables are encased in parenthesis when referenced in the replacement statement. The importance of this depends upon the type of values that might be sent to the macro. For instance, suppose we have this macro:

```
#define square(var1)     (var1 * var1)
   /* square this value*/
```

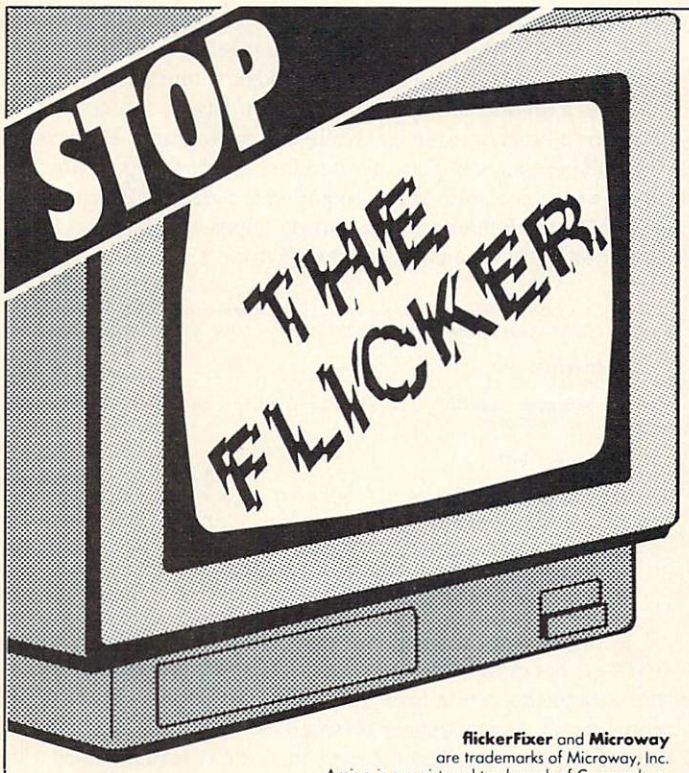
Now suppose the following code is encountered.

```
amount = 9;
new_amount = square(amount + 1);
```

By substituting into the macro, we end up with a statement that reads: new_amount = (amount + 1 * amount + 1). Whoops! The compiler did what you told it to do, not what you wanted it to do. In this example, instead of a value of 100, you end up with a value of 21. If we surround the macro variables with parenthesis, this error can be avoided. Sometimes more parenthesis are required around the entire macro results for the same reasons already noted.

Notice that the semicolon is left off the macro's replacement. There may be instances when you want to include the semicolon, but adding it will usually only be a source of irritation. Remember that in C, all statements end with a semicolon. After you write a few programs, it will become so natural that you will "miss" the fact that you are referencing a macro in a source line and terminate like every other statement. This might cause an error that the compiler will catch, but the problem might elude you for some time. Having multiple semicolons at the end of a line will not always cause a problem, but having a semicolon at the end of a macro definition means that it cannot be used as part of a "larger" statement (i.e. if, for), or as a parameter to a function.

Finally, if a macro cannot fit on one line, you must add a \ at the end of the line that is to be continued. This means, of course, that a macro's replacement line cannot end with this



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character. If you need such a macro, and your compiler allows it, you may be able to leave the next line blank (but commented to remind you). Most of the time you won't have to worry about this.

Conditional Compilation

The last general category of preprocessor control lines are used for conditional compilation. These directives can be used to add, eliminate, or alter the source code that gets compiled. It may not be obvious to you at this point how these would be useful. Later, I will give you a few examples to demonstrate how they might be used in a source file. First, though, we'll discuss their definitions.

There are three types of conditional compiler directives. Each begins by asking an "if-type" question, and ends with the control line — #endif. There is an optional statement, #else, which can be used to indicate what code to compile, should the if-type question prove false. The following lines indicate the syntax for each of the if-type directives.

```
#if constant-expression
#ifdef identifier
#ifndef identifier
```

The first conditional line causes the compiler to evaluate the constant expression. (Remember, a constant is a not a variable.) If the expression evaluates to a non-zero value, then the code contained within the directive is compiled with the remainder of the code. If the expression proves false, the compiler will omit the code between the #if and the #endif (or the #else if this is used).

Conditional number 2 checks to see whether the named identifier has been defined. For the compiler to recognize the identifier, a #define must be declared for the identifier. If the identifier is not defined, either because a #define was not included or a subsequent #undef was used to turn it off, then the compiler will skip the #else or #endif.

The last conditional compilation control line is very similar to the previous one. But instead of checking to see if the identifier has been declared, the compiler checks to see whether the identifier has not been declared. Again, a true evaluation (identifier not declared) will include the subsequent code, and a false evaluation will skip to the #endif or #else if it is included.

As I mentioned, it may be difficult to understand why you would want to use a conditional directive, especially if you are new to the C language. To demonstrate their usefulness, let's make up a few examples.

Suppose that, while developing an application, you had to add some code to help you debug a problem. Using a conditional compilation directive, you can keep this "debug" code

(continued)



from appearing in the final application without actually deleting it from the code. Why would you want to do this instead of just deleting it? Well, what if you deleted the code, only to discover later on that the problem still existed? If this happened, you would probably want to kick yourself for removing the debugging code (especially if it was complex to include in the first place).

Also, you might find later that another bug exists that could be debugged using the same code. If we use one of these simple conditional compilation control lines, we can avoid that boot in the behind. Take a look at the following portion of code.

```
#define DEBUG 1                         /* Debugging switch */

....

#ifdef DEBUG                /* if debug switch is defined */
   fprintf(stdprn,"Make it to so-and-so function\n");
#endif
```

As long as the definition exists, the compiler will include this debugging line that prints a message to the printer. When it is time to remove the debugging code, all you have to do is comment out (or delete) the #define for the DEBUG constant. If you have included several debugging messages, this is a much simpler method of removing that code. During the subsequent compilation, all the code that occurs inside a conditional directive referencing the DEBUG constant is omitted.

As a second example, suppose you have a source file that contains a function used by two different programs. However, a few different lines of code need to be included, depending upon which program you are compiling. Since the function has to be slightly different for the two programs, this gives us an opportunity to use a conditional directive.

```
/* if not compiling program 1 then comment out the  */
/* following #define, otherwise make sure it is operational */

#define PROG 1

void clear(buffer)      /* this function clears the buffer*/
char *buffer;
{
#ifndef PROG                        /* if program 2 */
    short x_cnt;                    /* loop counter variable */
    for(x_cnt = 0; x_cnt < MAX;x++) /* clear entire area*/
            buffer[x_cnt] = ' ';  /* clear to spaces */
#else
    *buffer = 0;            /* place a 0 (null) in the buffer*/
#endif
}
```

Notice that the previous example checks to see whether PROG is not defined (using #ifndef). If it is not defined, then the variable definition for x_cnt and the for loop are kept during compilation. The statement between the #else and #endif is omitted. If the compiler discovers that PROG is defined, as it is in this example, then the code that occurs before the #else is omitted, while the code following the #else and before the #endif is included. If the compiler was used on this example, you can see that the function will only have one statement in it.

Although these may not have been the best examples, you can probably begin to recognize where conditional compilation directive might be useful. I should also mention that conditional control lines can be nested. This may be especially useful if someday you develop a series of related programs (or different versions of the same program) that can reference some common code. Exceptions can be compiled in/out by turning on/off the appropriate switches, allowing you to maintain only one source file.

Now that you have a basic understanding (I hope) of the various types of preprocessor controls, you will be able to write better documented, more maintainable, code. Most C compilers usually include a few sample programs for you to examine. Take a few minutes to browse through a couple. Look for control lines and how they are used in the program. Most, if not all, will at least have the #include directive. If you find a reference to an include file, browse through it. This will not only give you a better understanding of the control lines, it will also help you understand the types of "things" that are usually placed into include files. Once you think you understand a preprocessor control line, write your own program to test your knowledge. Remember, you can learn a lot from experimenting.

•AC•

The Amazing Computing Freely Redistributable Software Library announces the addition of...

New Orleans Commodore Klub's

inNOCKulation Disk

Version 1.41

To help inform Amiga users of the newer Amiga viruses and provide them with the means to detect and eradicate those pesky little critters!

Files and directories on the inNOCKulation Disk include:

Virus_Texts (dir)
Various text files from various places (Amicus #24, PeopleLink, and elsewhere!) describing the Virus(es) and people's experiences and their recommendations; TVSB "The Virus Strikes Back": satirical text describing future efforts to rid the universe of the dreaded (silicon) viruses! Interview with the alleged SCA virus author!

WB_VirusCheckers (dir)

VirusX2.1
Runs in the background and checks disks for viruses or non-standard boot blocks whenever they are inserted. (Recognizes several viruses and non-standard boot blocks. Removes virus in memory. Has a built-in "view boot blocks" & other features.)

Sentry
Revision of VirusX1.01 in Lattice C.

ViewBoot
Highly active mouse-driven disk and memory virus-checker which allows you to look at the pertinent areas (useful in case you supect a NEW virus!)

VRTest3.2
Watches memory for viruses; will alert the user and allow their removal if found. Can check & INSTALL disks, etc.

CLI_VirusCheckers (dir)

AntiVirusII
From The Software Brewery (W. German). Disables a virus in memory.

Clk_Doctor3
Corrects problems with the clock (caused by malignant programs, perhaps not really a "virus") (A500 & A2000)

Guardian1.1
Checks for attempts at viral infection at boot! Allows you to continue with a normal boot (if desired). Includes a small utility program to permanently place the program on a copy of your kickstart disk.

KillVirus
Removes (any?) virus from memory.

VCheck12:
Checks for SCA virus on disk or in memory.

VCheck19
Checks for any virus or otherwise non-standard boot block.

VirusKiller
A graphically appealing and user friendly program by TRISTAR.

Boot-Block_Stuff

SafeBoot2.2
SafeBoot will allow the user to save custom boot sectors of all your commercial disks and save them for such an emergency. If a virus somehow manages to trash the boot sectors of a commercial disk, just run SafeBoot and it will restore the boot sectors, therefore saving your disk!!

Virus_Alert V2.0.1
Yet another anti-virus program with a twist. Once installed on your boot disk a message is displayed just after a warm or cold boot notifying the the user that the disk and memory are virus-free, and forcing a mouse-button press before continuing.

BootBack1
Saves and restores boot-blocks. Runs from CLI only.

Antivirus *aka AVBB*
Includes SEKA assembler source.

XBoot
Converts a boot-block into an executable file, so you may use your favorite debugger (Wack, Dis, ...) to study it.

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and a few freely redistributable goodies like:

B-Spread
MenuEd & VGad programming tools featured in "The Developing Amiga" (AC V3.8).

(Order Form on page 112)

The AMICUS & Fred Fish Public Domain Software Library

This software is collected from user groups and electronic bulletin boards around the nation. Each Amicus disk is nearly full, and is fully accessible from the Workbench. If source code is provided for any program, then the executable version is also present. This means that you don't need the C compiler to run these programs. An exception is granted for those programs only of use to people who own a C compiler.

The Fred Fish disk are collected by Mr. Fred Fish, a good and active friend of the Amiga.

Note: Each description line below may include something like 'S-O-E-D', which stands for 'source, object file, executable and documentation'. Any combination of these letters indicates what forms of the program are present. Basic programs are presented entirely in source code format.

AMICUS Disk 1

ABasic programs: Graphics

3DSolids	3d solids modeling prog. w/sample data files
Blocks	draws blocks
Cubes	draws cubes
Durer	draws pictures in the style of Durer
FScape	draws fractal landscapes
Hidden	3D drawing program, w/ hidden line removal
JPad	simple paint program
Optical	draw several optical illusions
PaintBox	simple paint program
Shuttle	draws the Shuttle in 3d wireframe
SpaceArt	graphics demo
Speaker	speech utility
Sphere	draws spheres
Spiral	draws color spirals
ThreeDee	3d function plots
Topography	artificial topography
Wheels	draws circle graphics
Xenos	draws fractal planet landscapes

ABasic programs: Tools

AddressBook	simple database program for addresses
CardFile	simple card file database program
Demo	multiwindow demo
KeyCodes	shows keycodes for a key you press
Menu	run many ABasic programs from a menu
MoreColors	way to get more colors on the screen at once, using aliasing
shapes	simple color shape designer SpeakIt speech and narrator demo

ABasic programs: Games

BrickOut	classic computer brick wall game
Othello	also known as 'go'
Saucer	simple shoot-em-up game
Spelling	simple talking spelling game
ToyBox	selectable graphics demo

ABasic programs: Sounds

Entertainer	plays that tune
HAL9000	pretends it's a real computer
Police	simple police siren sound
SugarPlum	plays "The Dance of the Sugarplum Fairies"

C programs:

ATerm	simple terminal program, S-E
cc	aid to compiling with Lattice C
decvnt	opposite of CONVERT for cross developers
Dotty	source code to the 'dotty window demo
echox	unix-style filename expansion, partial S,O-D
fasterfp	explains use of fast-floating point math
FixDate	fixes future dates on all files on a disk, S-E
freedraw	simple Workbench drawing prog.,S-E
GfxMem	graphic memory usage indicator, S-E
Grep	searches for a given string in a file with
docs.	ham shows off the hold-and-modify method of color generation
IBM2Amiga	fast parallel cable transfers between an IBM and an Amiga
Mandel	Mandelbrot set program, S-E
moire	patterned graphic demo, S-E
objfix	makes Lattice C object file symbols visible to Wack, S-E
quick	quick sort strings routine
raw	example sample window I/O
setlace	turns on interlace mode, S-E
sparks	qix-type graphic demo, S-E

Other executable programs:

SpeechToy	speech demonstration
WhichFont	displays all available fonts

Texts:

68020	describes 68020 speedup board from CSA
Aliases	explains uses of the ASSIGN command
Bugs	known bug list in Lattice C 3.02
CLICard	reference card for AmigaDOS CLI
CLICommands	guide to using the CLI
Commands	shorter guide to AmigaDOS CLI commands
EdCommands	guide to the ED editor
Filenames	AmigaDOS filename wildcard conventions
HalfBright	explains rare graphics chips that can do more colors
ModemPins	description of the serial port pinout
RAMdisks	tips on setting up your RAM: disk
ROMWack	tips on using ROMWack
Sounds	explanation of Instrument demo sound file format
Speed	refutation of Amiga's CPU and custom chip speed
WackCmds	tips on using Wack

AMICUS Disk 2

C programs:

alib	AmigaDOS object library manager , S-E
ar	text file archive program, S-E
fixobj	auto-chops executable files
shell	simple CLI shell, S-E
sq, usq	file compression programs, S-E
YachtC	a familiar game, S-E
Make	a simple 'make' programming utility, S-E
Emacs	an early version of the Amiga text editor, S-E-D

Assembler programs:

bsearch.asm	binary search code
qsort.asm	Unix compatible qsort() function, source and C test program
setjmp.asm	setjmp() code for Lattice 3.02
SVprintf	Unix system V compatible printf()
trees.o	Unix compatible tree() function, O-D

(This disk formerly had IFF specification files and examples. Since this spec is constantly updated, the IFF spec files have been moved to their own disk in the AMICUS collection.)

John Draper Amiga Tutorials:

Animate	describes animation algorithms
Gadgets	tutorial on gadgets
Menus	learn about Intuition menus

AMICUS Disk 3

C programs:

Xref	a C cross-reference gen., S-E
6bitcolor	extra-half-bright chip gfx demo, S-E
Chop	truncate (chop) files down to size, S-E
Cleanup	removes strange characters from text files
CR2LF	converts carriage returns to line feeds in Amiga files, S-E
Error	adds compile errors to a C file, S
Hello	window ex. from the RKM, S
Kermit	generic Kermit implementation, flakey, no terminal mode, S-E
Scales	sound demo plays scales, S-E
SkewB	Rubik cube demo in hi-res colors, S-E

AmigaBasicProgs(dir)

Automata	cellular automata simulation
CrazyEights	card game
Graph	function graphing programs
WitchingHour	a game

ABasIC programs:

Casino	games of poker, blackjack, dice, and craps
Gomoku	also known as 'othello'
Sabotage	sort of an adventure game

Executable programs:

Disassem	a 68000 disassembler, E-D
DpSlide	shows a given set of IFF pictures, E-D
Arrange	a text formatting program, E-D

Assembler programs:

Argoterm	terminal program with speech and Xmodem, S-E

AMICUS Disk 4 Files from the original Amiga Technical BBS

Note that some of these files are old, and refer to older versions of the operating system. These files came from the Sun system that served as Amiga technical support HQ for most of 1985. These files do not carry a warranty, and are for educational purposes only. Of course, that's not to say they don't work.

Complete and nearly up-to-date C source to 'image.ed', an early version of the Icon Editor. This is a little flaky, but compiles and runs.

An Intuition demo, in full C source, including files: demomenu.c, demomenu2.c, demoreq.c, getascii.c, idemo.c, idemo.guide, idemo.make, idemoall.h, nodos.c, and txwrite.c

addmem.c	add external memory to the system
bobtest.c	example of BOB use
consoleIO.c	console IO example
creaport.c	create and delete ports
creastdi.c	create standard I/O requests
creatask.c	creating task examples
diskio.c	example of track read and write
dotty.c	source to the 'dotty window' demo
dualplay.c	dual playfield example
flood.c	flood fill example
freemap.c	old version of 'freemap'
geltools.c	tools for VSprites and BOBs
gfxmem.c	graphic memory usage indicator
hello.c	window example from RKM
inputdev.c	adding an input handler to the input stream
joystik.c	reading the joystick
keybd.c	direct keyboard reading
layertes.c	layers examples
mousport.c	test mouse port
ownlib.c, ownlib.asm	example of making your own library with Lattice
paratest.c	tests parallel port commands
seritest.c	tests serial port commands
serisamp.c	example of serial port use
prinintr.c	sample printer interface code
prtbase.h	printer device definitions
regintes.c	region test program
setlace.c	source to interlace on/off program
setparallel.c	set the attributes of the parallel port
SetSerial.c	set the attributes (parity, data bits, etc.) of the serial port
singplay.c	single playfield example
speechtoy.c	source to narrator and phonetics demo
timedely.c	simple timer demo
timer.c	exec support timer functions
timrstuf.c	more exec support timer functions
WhichFont.c	loads and displays all available system fonts
process.i and prtbase.i	assmebler include files:
autorqstr.txt	warnings of deadlocks with autorequesters
consoleIO.txt	copy of the RKM console I/O chapter
diskfont.txt	warning of disk font loading bug
fullfunc.txt	list of #defines, macros, functions
inputdev.txt	preliminary copy of the input device chapter

License information on Workbench distribution license

printer pre-release copy of the chapter on printer drivers, from RKM 1.1

v11fd.txt 'diff' of .fd file changes from version 1.0 to 1.1

v28v1.diff 'diff' of include file changes from version 28 to 1.0

AMICUS Disk 5 Files from the Amiga Link / Amiga Information Network

Note that some of these files are old, and refer to older versions of the operating system. These files are from Amiga Link. For a time, Commodore supported Amiga Link, aka AIN, for online developer technical support. It was only up and running for several weeks. These files do not carry a warranty, and are for educational purposes only. Of course, that's not to say they don't work.

A demo of Intuition menus called 'menudemo', in C source

whereis.c	find a file searching all subdirectories
bobtest.c	BOB programming example
sweep.c	sound synthesis example

Assembler files:

mydev.asm	sample device driver
mylib.asm	sample library example
mylib.i	
mydev.i	
asmsupp.i	
macros.i	assembler include files

Texts:

amigatricks	tips on CLI commands
extdisk	external disk specification
gameport	game port spec
parallel	parallel port spec
serial	serial port spec
v1.1update	list of new features in version 1.1
v1.1h.txt	'diff' of include file changes from version 1.0 to version

Files for building your own printer drivers, including dospecial.c, epsondata.c, init.asm, printer.c, printer.link, printertag.asm, render.c, and wait.asm. This disk does contain a number of files describing the IFF specification. These are not the latest and greatest files, but remain here for historical purposes. They include text files and C source examples. The latest IFF spec is elsewhere in this library.

AMICUS Disk 6 IFF Pictures

This disk includes the DPSlide program, which can view a given series of IFF pictures, and the 'showpic' program, which can view each file at the click of an icon. The pictures include a screen from ArticFox, a Degas dancer, the guys at Electronic Arts, a gorilla, horses, King Tut, a lighthouse, a screen from Marble Madness, the Bugs Bunny Martian, a still from an old movie, the Dire Straits moving company, a screen from Pinball Contruction Set, a TV newcaster, the PaintCan, a world map, a Porsche, a shuttle mission patch, a tyrannosaurus rex, a planet view, a VISA card, and a ten-speed.

AMICUS Disk 7 DigiView HAM demo picture disk

This disk has pictures from the DigiView hold-and-modify video digitizer. It includes the ladies with pencils and lollypops, the young girl, the bulldozer, the horse and buggy, the Byte cover, the dictionary page, the robot and Robert. This includes a program to view each picture separately, and all together as separate, slidable screens. The 'seeilbm' program, to turn any screen into an IFF picture.

AMICUS Disk 8

C programs:

Browse	view text files on a disk, using menus S-E-D
Crunch	removes comments and white space from C files, S-E
IconExec	EXECUTE a series of commands from Workbench S-E
PDScreen Dump	dumps Rastport of highest screen to printer
SetAlternate	sets a second image for an icon, when clicked once S-E
SetWindow	makes windows for a CLI program to run under Workbench S-E
SmallClock	a small digital clockin a window menu bar
Scrimper	the screen printer in the fourth AC S-E

Amiga Basic Programs:

(Note: Many of these programs are present on AMICUS Disk 1. Several of these were converted to Amiga Basic, and are included here.)

AddressBook	a simple address book database
Ball	draws a ball
Cload	program to convert Compuserve hex files to binary, S-D
Clue	the game, Intuition driven
ColorArt	art drawing program
DeluxeDraw	the drawing program in the 3rd AC, S-D
Eliza	conversational computer psychologist
Othello	the game, as known as 'go'
RatMaze	3D ratmaze game
ROR	boggling graphics demo
Shuttle	draws 3D pictures of the space shuttle
Spelling	simple spelling program
YoYo	wierd zero-gravity yo-yo demo, tracks yo-yo to the mouse

Executable programs:

3Dcube	Modula-2 demo of a rotating cube
AltIcon	sets a second icon image, displayed when the icon is clicked
AmigaSpell	a slow but simple spell checker, E-D
arc	the ARC file compression progra must-have for telecom, E-D
Bertrand	graphics demo
disksalvage	prog. to rescue trashed disks, E-D
KwikCopy	a quick but nasty disk copy program: ignores errors, E-D
LibDir	lists hunks in an object file E-D
SaveILBM	saves any screen as IFF pic.E-D ??
ScreenDump	shareware screen dump prog, E only
StarTerm	version 2.0, term program, XmodemE-D

Texts:

LatticeMain	tips on fixing _main.c in Lattice
GDiskDrive	make your own 5 1/4 drive
GuruMed	explains the Guru numbers
Lat3.03bugs	bug list of Lattice C version 3.03
MForgeRev	user's view of the MicroForge HD
PrintSpooler	EXECUTE-based print spool prog.

.BMAP files:

These are the necessary links between Amiga Basic and the system libraries. To take advantage of the Amiga's capabilities in Basic, you need these files. BMAPs are included for 'clist', 'console', 'diskfont', 'exec', 'icon', 'intuition', 'layers', 'mathffp', mathieeedoubas', 'mathieeesingbas', 'mathtrans', 'potgo', 'timer' and 'translator'.

AMICUS Disk 9

Amiga Basic Programs:

FlightSim	simple flight simulator program
HuePalette	explains Hue, Saturation, & Intensity
Requester	ex. of requesters from Amiga Basic
ScrollDemo	demonstrates scrolling capabilities
Synthesizer	sound program
WorldMap	draws a map of the world

Executable programs:

Boing!	latest Boing! demo,with selectable speed,E
Brush2C	converts an IFF brush to C data instructions, initialization code, E
Brush2Icon	converts IFF brush to an icon, E
Dazzle	graphics demo, tracks to mouse, E
DeciGEL	assembler program for stopping 68010 errors, S-E-D
Klock	menu-bar clock and date display, E
life	the game of life, E
TimeSet	Intuition-based way to set the time & date
EMEmacs	another Emacs, more oriented to word processing, S-E-D
MyCLI	a CLI shell, works without the Workbench, S-E-D

Texts:

FnctnKeys	read function keys from Amiga Basic
HackerSIn	explains how to win the game 'hacker'
Ist68010	guide to installing a 68010 in your Amiga
Boing!	latest Boing! demo,with selectablespeed, E
Brush2C	converts an IFF brush to C data instructions, initialization code, E
Brush2Icon	converts IFF brush to an icon, E
Dazzle	graphics demo, tracks to mouse, E
DeciGEL	assembler program for stopping 68010 errors, S-E-D
Klock	menu-bar clock and date display, E
life	the game of life, E
TimeSet	Intuition-based way to set the time date,
EMEmacs	another Emacs, more oriented to word processing, S-E-D
MyCLI	a CLI shell, works without the Workbench, S-E-D

For PDS orders, please use form on page 112

Texts:

FnctnKeys	explains how to read function keys from Amiga Basic
HackerSin	explains how to win the game 'hacker'
list68010	guide to installing a 68010 in your Amiga
PrinterTip	sending escape sequences to your printer
StartupTip	tips on setting up your startup-sequence file
XfrmrReview	list of Transformer programs that work

Printer Drivers:

Printer drivers for the Canon PJ-1080A, the C Itoh Prowriter, an improved Epson driver that eliminates streaking, the Epson LQ-800, the Gemini Star-10, the NEC 8025A, the Okidata ML-92, the Panasonic KX-P10xx family, and the Smith-Corona D300, with a document describing the installation process.

AMICUS Disk 10 **Instrument sound demos**

This is an icon-driven demo, circulated to many dealers. It includes the sounds of an acoustic guitar, an alarm, a banjo, a bass guitar, a boink, a calliope, a car horn, claves, water drip, electric guitar, a flute, a harp arpegio, a kickdrum, a marimba, a organ minor chord, people talking, pigs, a pipe organ, a Rhodes piano, a saxophone, a sitar, a snare drum, a steel drum, bells, a vibrophone, a violin, a wailing guitar, a horse whinny, and a whistle.

AMICUS Disk 11

C programs

dirutil	Intuition-based, CLI replacement manager S-E
cpri	shows and adjusts priority of CLI processes, S-E
ps	shows info on CLI processes, S-E
vidtex	displays Compuserve RLE pics, S-E

AmigaBasic programs

pointered	pointer and sprite editor program
optimize	optimization ex ample from AC article
calendar	large, animated calendar, diary and date book program
amortize	loan amortizations
brushtoBOB	converts small IFF brushes to AmigaBasic BOB OBJECTS
grids	draw and play waveforms
hilbert	draws Hilbert curves
madlib	mad lib story generator
mailtalk	talking mailing list program
meadows3D	3D graphics program, from A C™ article
mousetrack	mouse tracking example in hires mode
slot	slot machine game
tictactoe	the game
switch	pachinko-like game
weird	makes strange sounds

Executable programs

cp	unix-like copy command, E
cls	screen clear, S-E
diff	unix-like stream editor uses 'diff' output to fix files
pm	chart recorder performances indicator

Assembler programs

cls	screen clear and CLI arguments example

Modula-2

trails	moving-worm graphics demo
caseconvert	converts Modula-2 keywords to uppercase

Forth

Analyze	Breshehan circle algorithm example 12 templates for the spreadsheet Analyze

There are four programs here that read Commodore 64 picture files. They can translate Koala Pad, Doodle, Print Shop and News Room graphics to IFF format. Getting the files from your C-64 to your Amiga is the hard part.

AMICUS Disk 12

Executable programs

blink	'alink' compatible linker, but faster, E-D
clean	spins the disk for disk cleaners, E-D
epsonset	sends Epson settings to PAR from menu E-D
showbig	view hi-res pics in low-res superbitmap, E-D
speaktime	tell the time, E-D
undelete	undeletes a file, E-D
cnvapldhm	converts Apple][low, medium and high res pictures to IFF, E-D
menued	menu editor produces C code for menus, E-D
quick	quick disk-to-disk nibble copier, E-D
quickEA	copies Electronic Arts disks, removes protection, E-D
txed 1.3	demo of text editor from Microsmiths,E-D

C programs

spin3	rotating blocks graphics demo, S-E-D
popcli	start a new CLI at the press of a button, like Sidekick, S-E-D
vsprite	VSprite example code from Commodore, S-E-D
AmigaBBS	Amiga Basic bulletin board prog., S-D

Assembler programs

star10	makes star fields like Star Trek intro,S-E-D

Pictures

Mount Mandelbrot	3D view of Mandelbrot set
Star Destroyer	hi-res Star Wars starship
Robot	robot arm grabbing a cylinder

Texts

vendors	Amiga vendors, names, addresses
cardco	fixes to early Cardco memory boards
cinclude	cross-reference to C include files
mindwalker	clues to playing the game well
slideshow	make your own slideshows from the Kaleidoscope disk

AMICUS Disk 13

Amiga Basic programs

Routines from Carolyn Scheppner of CBM Tech Support, to read and display IFF pictures from Amiga Basic. With documentation. Also included is a program to do screen prints in Amiga Basic, and the newest BMAP files, with a corrected ConvertFD program. With example pictures, and the SaveILBM screen capture program.

Routines to load and play FutureSound and IFF sound files from Amiga Basic, by John Foust for Applied Visions. With documentation and C and assembler source for writing your own libraries, and interfacing C to assembler in libraries. With example sound.

Executable programs

gravity	Sci Amer Jan 86 gravitation graphic simulation, S-E-D

Texts

MIDI	make your own MIDI instrument interface, with documentation and a hi-res schematic picture.

AMICUS Disk 14

Several programs from Amazing Computing issues:

Tools

Dan Kary's	C structure index program, S-E-D

Amiga Basic programs:

BMAP Reader	by Tim Jones
IFFBrush2BOB	by Mike Swinger
AutoRequester	example
DOSHelper	Windowed help system for CLI commands, S-E-D
PETrans	translates PET ASCII files to ASCII files, S-E-D
C Squared	Graphics program from Scientific American, Sept 86, S-E-D
crlf	adds or removes carriage returns from files, S-E-D
dpdecode	decrypts Deluxe Paint, remo
ves copy	protection, E-D
queryWB	asks Yes or No from the user returns exit code, S-E
vc	VisiCalc type spreadsheet, no mouse control, E-D
view	views text files with window and
slider	gadget, E-D

Oing, Sproing, yaBoing, Zoing are sprite-based Boing! style demos, S-E-D

CLIClock, sClock, wClock are window border clocks, S-E-D

Texts

An article on long-persistance phospor monitors, tips on making brushes of odd shapes in Deluxe Paint, and recommendations on icon interfaces from Commodore-Amiga.

AMICUS Disk 15

The C programs include:

'pr'	a file printing utility, which can print files in the background, and with line numbers and control character filtering.
'fm'	displays a chart of the blocks allocated on a disk.
'Ask'	questions an 'execute' file, returns an error code to control the execution in that batch file
'Stat'	an enhanced version of AmigaDOS 'status' command.
'Dissolve'	random-dot dissolve demo displays IFF picture slowly, dot by dot, in a random fashion.
'PopCLI2'	invoke new CLI window at the press of a key.

The executable programs include:

'Form'	file formatting program through the printer driver to select print styles
'DiskCat'	catalogs disks, maintains, sorts,merges lists of disk files
'PSound'	SunRize Industries' sampled sound editor & recorder
'Iconmaker'	makes icons for most programs
'Fractals'	draws great fractal seascapes and mountain scapes.
'3D Breakout'	3D glasses, create breakout in a new dimension
'AmigaMonitor'	displays lists of open files,
memory use,	tasks, devices and ports in use.
'Cosmoroids'	version of 'asteroids' for the Amiga.
'Sizzlers'	high resolution graphics demo written in Modula 2.

Texts:

'ansi.txt'	explains escape sequences the CON: device responds to.
'FKey'	includes template for making paper to sit in the tray at the top of the Amiga keyboard.
'Spawn'	programmer's document from Commodore Amiga, describs ways to use the Amiga's multitasking capabilities in your own programs.

AmigaBasic programs:

'Grids'	draw sound waveforms, and hear them played.
'Light'	a version of the Tron light-cycle video game.
'MigaSol'	a game of solitaire.
'Stats'	program to calculate batting averages
'Money'	"try to grab all the bags of money that you can."

AMICUS 15 also includes two beautiful IFF pictures, of the enemy walkers from the ice planet in Star Wars, and a picture of a cheetah.

AMICUS Disk 16

'juggler' demo by Eric Graham. a robot juggler bouncing three mirrored balls, with sound effects. Twenty-four frames of HAM animation are flipped quickly to produce this image. You control the speed of the juggling. The author's documentation hints that this program might someday be available as a product.

IFF pictures

parodies of the covers of Amiga World and Amazing Computing magazines.

C programs:

'inputhandler'	example of making an input handler.
'FileZap3'	binary file editing program
'ShowPrint'	displays IFF picture, and prints it.
'Gen'	program indexes and retrieves C structures and variables declared in the Amiga include file system.

Executable Programs:

'FixHunk2'	repairs an executable program file for expanded memory
'ms2smus'	converts Music Studio files to IFF standard 'SMUS' format. I have heard this program might have a few bugs, especially in regards to very long songs, but it works in most cases.
'Missile'	Amiga version of the 'Missile Command' video game,

This disk also contains several files of scenarios for Amiga Flight Simulator II. By putting one of these seven files on a blank disk, and inserting it in the drive after performing a special command in this game, a number of interesting locations are preset into the Flight Simulator program. For example, one scenario places your plane on Alcatraz, while another puts you in Central Park

AMICUS Disk 17

Telcommunications disk whuch contains six terminal programs.

"Comm" V1.33	term prog. with Xmodem, WXmodem,
"ATerm" V7.2	term prog. includes Super Kermit
"VT-100"V2.6	Dave Wecker's VT-100 emulator with Xmodem,Kermit, and scripting
"Amiga Kermit"	V4D(060) port of the Unix C-Kermit
"VTek" V2.3.1	Tektronix graphics terminal emulator based on the VT-100 prog. V2.3 and contains latest 'arc' file compression
"AmigaHost"	V0.9 for Compuserve. Includes RLE graphics abilities & CIS-B file transfer protocol.
"FixHunk"	expansion memory necessity
"FixObj"	removes garbage characters from modem received files
"Txt"	filters text files from other systems to be read by the Amiga E.C.
"addmem"	executeable version for use with mem expansion article in AC v2..1
'arc'	file documentation and a basic tutorial on un 'arc'ing files
"arcre"	for makeing "arc" files E.C.

AMICUS Disk 18

Logo	Amiga version of the populacomputer language, with example programs, E-D
Tv"Text	Demo version of the TV"Text character generator
PageSetter	Freely distributable versions of the updated PagePrint and PageIFF programs for the PageSetter desktop publishing package.
FullWindow	Resizes any CLI window using only CLI commands, E-D
Life3d	3-D version of Conway's LIFE program, E-D
Deldisk	CLI utility to re-assign a new Workbench disk, S-E-D
Calendar.WKS	Lotus-compatible worksheet that makes calendars
SetKey	Demo of keyboard key re-programmer, with IFF picture to make function key labels, E-D
VPG	Video pattern generator for aligning monitors, E-D
HP-10C	Hewlett-Packard-like calculator, E-D
SetPrefs	Change the Preferences settings on the fly, in C, S-E-D
StarProbe	Program studies stellar evolution. C source included for Amiga and MS-DOS, S-E-D
ROT	C version of Colin French's AmigaBasic ROT program from Amazing Computing. ROT edits and displays polygons to create three dimensional objects. Up to 24 frames of animation can be created and displayed. E-D
Scat	Like lng, windows on screen run away from the mouse, E-D
DK	Decays" the CLI window into dust, in Modula 2, S-E-D
DropShadow2	Adds layered shadows to Workbench windows, E-D

AMICUS Disk 19

This disk carries several programs from Amazing Computing. The IFF pictures on this disk include the Amiga Wake part T-shirt logo, a sixteen-color hi-res image of Andy Griffith, and five Amiga Live! pictures from the Amazing Stories episode that featured the Amiga.

Solve	Linear equation solver in assembly language, S-E-D
Gadgets	Bryan Catley's AmigaBasic tutorial,
Household	Bryan Catley's AmigaBasic household inventory program, S-D
Waveform	Jim Shields' Waveform Workbench, AmigaBasic, S-D
DiskLib	John Kennan's AmigaBasic disk librarian program, S-D
Subscripts	Ivan Smith's AmigaBasic subscript example, S-D
String, Boolean	C programs and executables for Harriet Maybeck Tolly's Intuition tutorials, S-E-D
Skinny C	Bob Riemersma's example for making small C programs, S-E-D
COMAL.h	Make C look like COMAL header file,
EmacsKey	Makes Emacs function key definitions by Greg Douglas, S-D
AMon 1.1	Snoop on system resource use, E-D
BTE	Bard's Tale character editor, E-D
Size	CLI program shows the size of a given set of files, E-D
WinSize	CLI window utility resizes current window, S-E-D

AMICUS Disk 20

Compactor, Decoder Steve Michel AmigaBasic tools, S-D

BobEd	BOB and sprite editor written in C,S-E-D
SpriteMasterII	Sprite editor and animator by Brad Kiefer, E-D
BlitLab	Blitter chip exploration C program by Tomas Rokicki, S-E-D
FPic	Image processing program by Bob Bush loads and saves IFF images, changes them with several techniques, E-D
Bankn	Complete home banking program, balance your checkbook! E-D

AMICUS Disk 21

Target	Makes each mouse click sound like a gunshot, S-E-D
Sand	Simple game of sand that follows the mouse pointer, E-D
PropGadget	Harriet Maybeck Tolly's proportional gadget example, S-E
EHB	Checks to see if you have extra-half-bright graphics, S-E-D
Piano	Simple piano sound program
CelScripts	Makes cel animation scripts for Aegis Animator, in AmigaBasic

This disk has electronic catalogs for AMICUS disks 1 to 20 and Fish disks 1 to 80. They are viewed with the DiskCat program, included here.

AMICUS Disk 22

Cycles	Light cycle game, E-D
Show_PrintII	Views and prints IFF pictures, including larger than screen
PrtDrvGen2.3	Latest version of a printer driver generator
Animations	VideoScape animations of planes and boing ball
Garden	Makes fractal gardenscapes
BasicSorts	Examples of binary search and insertion sort in AmigaBasic

AMICUS Disk 23

An AMICUS disk completely dedicated to music on the Amiga. This disk contains two music players, songs, instruments, and players to bring the thrill of playing "Big Sound" on your Amiga

Instruments	a collection of 25 instruments for playing and creating music. The collection ranges from Cannon to Marimba
List INSTR	program to list the instruments DMCS will not load as well as list the origins for any instrument.
Music	a collection of 14 Classical pieces
1812Overture	The 16 minute classical feature complete with Cannon!

Three Amiga Music Players:

SMUSPlay
MusicCraft2SMUS
MusicStudio2SMUS

AMICUS Disk 24

Sectorama	A disk sector editor for any AmigaDOS file-structured device, recover files from a trashed hard disk. By David Joiner of Microllusions
Iconize	Reduces the size of IFF images, companion program, Recolor, remaps the palette colors of one picture to use the palette colors of another. Using these programs and a tool to convert IFF brushes to Workbench icons, make icons look like miniatures of the pictures.
CodeDemo	Modula-2 program converts assembler object files to inline CODE statements. Comes with a screen scrolling example
AmiBug	Workbench hack makes the same fly walk across the screen at random intervals. Otherwise, completely harmless.
BNTools	Three examples of assembly language code from Bryce Nesbitt: 1. SetLace,prog to switch interlace on&off. 2. Why, replace AmigaDOS CLI Why 3. Loadlt, prog to load a file into memory until a reboot. (Only the most esoteric hackers will find Loadlt useful.)
Monolace	CLI program resets Preferences to several colors of monochrome & interlace screens. C source is included, works with DisplayPref, a CLI program which displays the current Preferences settings.
BoingMachine	A ray-traced animation of a perpetual motion Boing-making machine, includes the latest version of the Movie program, which has the ability to play sounds along with the animation. By Ken Offer
Daisy	Example of using the translator and narrator devices to make the Amiga talk. It is written in C.
QuickFlix	Script-driven animation and slideshow program flips through IFF images.
BMon	System monitor AmigaBasic program ; perform simple manipulations of memory.
Moose	Random background program, a small window opens with a moose resembleing Bullwinklesaying witty phrases user definable.
DGCS	Deluxe Grocery Construction Set, simple Intuition-based prog for assembling and printing a grocery list.
The Virus Check	directory holds several programs relating to the software virus that came to the US from pirates in Europe as detailed in Amazing Computing V2.12. Bill Koester's full explanation of the virus code is included. One program checks for the software virus on a Workbench disk; the second program checks for the virus in memory, which could infect other disks.

AMICUS Disk 25

Nemesis	Graphics demo pans through space towards the mythical dark twin of the sun with wonderful music and space graphics.
The KickPlay	directory holds text that describes several patches to the Kickstart disk. For Amiga 1000 hackers who feel comfortable patching a disk in hexadecimal, KickPlay offers the chance to automatically do an ADDMEM for old expansion memory, as well as the ability to change the picture of the "insert Workbench" hand. A program is also included for restoring the correct checksum of the Kickstart disk.
KeyBird	BASIC prog edits keymaps, adjust the Workbench keymaps or create your own.

For PDS orders, please use form on page 112

8ColorWB	Modifies the Workbench so three bitplanes are used, icons can have eight colors, instead of four, eight-color icons are included. Public domain program "zapicon" or "brush2icon" converts eight-color IFF brushes to icons, to use Deluxe Paint to make icons for this new Workbench.
Brushicon	Converts brushes to icons (bizarr docs).
Egraph	Graphing prog reads [x,y] values from a file and displays them on the screen, similar to the same-named Unix program.
Keep 1.1	Message-managing program for telecommunications, lets you save messages from an online transcript to another file, understands the message format of the national networks and several types of bulletin board software. Moves through the transcript and save messages
Kill.fastdir	Speed up directory access, it creates a small file in each directory on a disk which contains the information about the files, will also remove all the "fastdir" files from each directory. by CLImate's authors
The LaceWB program changes between interlace and non-interlace Workbench. Previously, you were forced to reboot after changing Preferences to an interlaced screen. This program flips between the normal and extended screen heights.	
PW_Utility	A shareware utility for ProWrite users, changes margin settings and font types.
Guru	A CLI program, prints out probable causes for Guru mediations; C source included.
DiskWipe	Latest from Software Distillery, removes files from directories or disk drives, much faster than "delete."
Snow	AmigaBasic makes snowflake designs.
Mlist	Mailing list database.
Softballstats	Maintain softball statistics/ team records.
Dodge	Short Modula-2 program moves the Workbench screen around after a period of time, prevents monitor burn-in.

AMICUS Disk 26

Todor Fay's SoundScape module code from his Amazing Computing articles. The source to Echo, Chord, TX, and VU is included. The Lattice and Manx C source code is here, along with the executable modules.	
Claz2	Update of prog to convert IFF images to PostScript files for printing on laser printers
SDBackup	Hard disk backup prog with Lempel-Ziv compression to reduce the necessary number of disks.
TCB	Prints information about tasks and processes in the system; assembler source is included.
FunBut	Lets a function key act like a rapid series of left mouse button events.
DC	A handy program for people who use an Amiga 1020 5 1/4 inch drive as an AmigaDOS floppy. A Workbench program that sends a DiskChange signal to the operating system: instead of typing "diskchange df2:" over and over again, just click on the icon. C source included.
System config	File makes screen 80 columns wide of text in the Scribble! word processor.
Dick2Ram	2 programs to move the Scribble! spelling dictionary to and from the RAM disk.
Lexical	Analyzes a text file and gives the Gunning-Fog, Flesch, and Kincaid indices which measure readability.
HexDump	Modula-2 program to display memory locations in hexadecimal.
Tartan	AmigaBasic; design Tartan plaids.
DirMaster	Disk catalog program.
BMP	plays 8SVX sampled sounds in the background while something else is happening in the Amiga, as your Amiga is booting, for example.
ShowPt	CLI program changes your pointer to a given pointer.
AMICUS 26 also has a collection of mouse pointers, & Workbench program to display them	

Fred Fish Public Domain Software

Fred Fish Disk 1:

amigademo	Graphical benchmark for comparing amigas.
amigaterm	simple communications program with Xmodem
balls	simulation of the "kinetic thingy" with balls on strings
colorful	Shows off use of hold-and-modify mode.
dhrystone	Dhrystone benchmark program.
dotty	Source to the "dotty window" demo on the Workbench disk.
freedraw	A small "paint" type program with lines, boxes, etc.
gad	John Draper's Gadget tutorial program
gfxmem	Graphical memory usage display prog.
halfbrite	demonstrates "Extra-Half-Brite" mode, if you have it
hello	simple window demo
lattfp	accessing the Motorola Fast Floating Point library from C
palette	Sample prog. to design color palettes.
trackdisk	Demonstrates use of the trackdisk driver.
requesters	John Draper's requester tutorial and example program.
speech	Sample speech demo program. Stripped down "speechtoy".
speechtoy	Another speech demo program.

Fred Fish Disk 2:

alib	Object module librarian.
cc	Unix-like frontend for Lattice C compiler.
dbug	Macro based C debugging package. Machine independent.
make	Subset of Unix make command.
make2	Another make subset command.
microemacs	Small version of emacs editor, with macros, no extensions
portar	Portable file archiver.
xrf	DECUS C cross reference utility.

Fred Fish Disk 3:

gothic	Gothic font banner printer.
roff	A "roff" type text formatter.
tf	A very fast text formatter
cforth	A highly portable forth implementation. Lots of goodies.
xlisp	Xlisp 1.4, not working correctly.

Fred Fish Disk 4:

banner	Prints horizontal banner
bgrep	A Boyer-Moore grep-like utility
bison	CNU Unix replacement 'yacc', not working.
bm	Another Boyer-Moore grep-like utility
grep	DECUS grep
kermit	simple portable Kermit with no connect mode.
MyCLI	Replacement CLI for the Amiga. V. 1.0
mandel	A Mandelbrot set program, by Robert French and RJ Mical

Fred Fish Disk 5

cons	Console device demo program with supporting macro routines.
treemap	Creates a visual diagram of free memory
input.dev	sample input handler, t raps key or mouse events
joystick	Shows how to set up the gameport device as a joystick.
keyboard	demonstrates direct communications with the keyboard.
layers	Shows use of the layers library
mandelbrot	IFF Mandelbrot program
mouse	hooks up mouse to right joystick port
one.window	console window demo
parallel	Demonstrates access to the parallel port.
printer	opening and using the printer, does a screen dump, not working
print.support	Printer support routines, not working.
proctest	sample process creation code, not working
region	demos split drawing regions
samplefont	sample font with info on creating your own
serial	Demos the serial port
singlePlayfield	Creates 320 x 200 playfield
speechtoy	latest version of cute speech demo
speech.demo	simplified version of speechtoy, with IO requests
text.demo	displays available fonts
timer	demos timer.device use
trackdisk	demos trakcdisk driver

Fred Fish Disk 6:

compress	like Unix compress, a file squeezer
dadc	analog clock impersonator
microemacs	upgraded version of microemacs from disk 2
mult	removes multiple occuring lines in files
scales	demos using sound and audio functions
setparallel	Allows changing parallel port parameters
setserial	Allows changing serial port parameters.
sortc	quicksort based sort program, in C
stripc	Strips comments and extra whitespace from C source

Fred Fish Disk 7:

This disk contains the executables of the game Hack V 1.0.1.

Fred Fish Disk 8:

This disk contains the C source to Hack on disk 7.

Fred Fish Disk 9:

moire	Draws moire patterns in black and white
MVP-FORTH	Mountain View Press Forth, version 1.00.03A. A shareware version of FORTH from Fantasia Systems.
proff	a more powerful text formatting program
setface	Prog to toggle interlace mode on and off
skewb	a rubic's cube type demo
sparks	moving snake Graphics demo

Fred Fish Disk 10:

conquest	An interstellar adventure simulation game
dehex	convert a hex file to binary
filezap	Patch program for any type of file.
fixobj	Strip garbage off Xmodem transferred files.
iff	Routines to read and write iff format files.
ld	simple directory program
ls	Minimal UNIX ls, with Unix-style wildcarding, in C
sq,usq	file squeeza and unsqueeze
trek73	Star Trek game
yachtc	Dice game.

Fred Fish Disk 11:

dpslide	slide show program for displaying IFF images with miscellaneous pictures

Fred Fish Disk 12:

amiga3d sign*.	Shows a rotating 3 dimensional solid "Amiga
ArgoTerm	a terminal emulator program, written in assembler
arrow3d	Shows a rotating 3 dimensional wire frame arrow.
ld4	directory listing program
IconExec	
SetWindow	two progs for launching progs from Workbench, presently only works under CLI.
SetAlternate	Makes an icon show a second image when clicked once
StarTerm	terminal emulator, with ASCII Xmodem, dialer, more.

Fred Fish Disk 13:

A Bundle of Basic programs, including:

Jpad	toybox	ezspeak	mandlebrot
xmodem	3dsolids	addbook	algebra
ror	amgseq1	amiga-copy	band
bounce	box	brickout	canvas
cardfi	circle	colorcircles	Copy
cubes1	cutpaste	datedogstar	
dragon	draw	dynamictriangle	
Eliza	ezterm	fillibuster	fractal
fscape	gomoku	dart	haiku
hal9000	halley	hauntedM	hidden
join	loz	mandel	menu
minipaint	mouse	Orthello	patch
pena	pinwheel	gboxrandom-circles	
Readme	rgb	rgbtest	Rord
sabotage	salestalk	shades	shapes
shuttle			
sketchpad	spaceart	speakspeach	
speecheasy	spell	sphere	
spiral	striper	superpad	suprshr
talk	terminal		
termtest	tom	topography	triangle
wheels	xenos	xmostriper	

(note: some programs are Abasic, most are Amigabasic, and some programs are presented in both languages)

Fred Fish Disk 14:

amiga3d	update of #12, includes C source to a full hidden surface removal and 3D graphics
beep	Source for a function that generates a beep sound
dex	extracts text from within C source files
dimensions	demonstrates N dimensional graphics
filezap	update of disk 10, a file patch utility
gfxmem	update of disk 1, graphic memory usage indicator
gi	converts IFF brush files to Image struct, in Ctext.
pdterm	simple ANSI VT100 terminal emulator, in 80 x 25 screen
shell	simple Unix 'csh' style shell
termcap	mostly Unix compatible 'termcap' implementation.

Fred Fish Disk 15:

Blobs	graphics demo, like Unix 'worms'
Clock	simple digital clock program for the title bar
Dazzle	An eight-fold symmetry dazzler program. Really pretty!
Fish	double buffered sequence cycle animation of a fish
Monopoly	A really nice monopoly game written in AbasiC.
OkidataDump	Okidata ML92 driver and WorkBench screen dump program.
Polydraw	A drawing program written in AbasiC.
Polytractals	A fractal program written in AbasiC.

Fred Fish Disk 16:

A complete copy of the latest developer IFF disk

Fred Fish Disk 17:

The NewTek Digi-View video digitizer HAM demo disk

Fred Fish Disk 18:

AmigaDisplay	dumb terminal program with bell, selectable fonts
Ash	Prerelease C Shell-like shell program, history, loops, etc.
Browser	wanders a file tree, displays files, all with the mouse
MC68010	docs on upgrading your Amiga to use a MC68010
Multidim	rotate an N dimensional cube with a joystick
PigLatin	SAY command that talks in Pig Latin
Scrimper	Screen image printer
Xlisp1.6	source, docs, and execut for a Lisp interpret.

Fred Fish Disk 19:

BlackJack	text-oriented blackjack game
JayMinerSlides	Slides by Jay Miner, Amiga graphics chip designer, showing flowchart of the Amiga internals, in 640 x 400.
Keymap_Test	test program to test the key mapping routines
LockMon	Find unclosed file locks, for programs that don't clean up.

Fred Fish Disk 20:

AmigaToAtari	converts Amiga object code to Atari form
DiskSalv	program to recover files from a trashed AmigaDOS disk.
Hash	example of the AmigaDOS disk hashing function
Hd	Hex dump utility ala Computer Language magazine, April 86
MandelBrots	Mandelbrot contest winners
MultiTasking	Tutorial and examples for Exec level multitasking
Pack	strips whitespace from C source
PortHandler	sample Port-Handler program that performs. Shows BCPL environment
Random	Random number generator in assembly, f or C or assembler.
SetMouse2	sets the mouse port to right or left
SpeechTerm	terminal Emulator with speech capabilities, XModem
TxEd	Demo editor from Microsmith's Charlie Heath

Fred Fish Disk 21

This is a copy of Thomas Wilcox's Mandelbrot Set Explorer disk. Very good!

Fred Fish Disk 22

This disk contains two new "strains" of microemacs.

Lemacs	version 3.6 by Daniel Lawrence. For Unix V7, BSD 4.2, Amiga, MS-DOS, VMS. Uses Amiga function keys, status line, execute, startup files, more.
Pemacs	By Andy Poggio. New features include <ALT> keys as Meta keys, mouse support, higher priority, backup files, word wrap, function keys.

Fred Fish Disk 23

Disk of source for MicroEmacs, several versions for most popular operating systems on micros and mainframes. For people who want to port MicroEmacs to their favorite machine.

Fred Fish Disk 24:

Conques	interstaller adventure simulation game
Csh	update to shell on Disk 14, with built in commands,named variables substitution.
Modula-2	A pre-release version of the single pass Modula-2 compiler originally developed for MacIntosh at ETHZ. This code was transmitted to the AMIGA and is executed on the AMIGA with a special loader. Binary only.

Fred Fish Disk 25

Graphic Hack	A graphic version of the game on disks 7 and 8 This is the graphics-oriented Hack game by John Toebes. Only the executable is present.

Fred Fish Disk 26

UnHunk	Processes the Amiga "hunk" loadfiles. Collect code, data, and bss hunks together, allows individual specificatio of code, data, and bss origins, and generates binary file with format reminiscent of Unix "a.out" format. The output file can be easily processed by a separate program to produce Motorola "S-records" suitable for downloading to PROM programmer. By Eric Black.
C-kermit	Port of the Kermit file transfer program and server.
Ps	Display and set process priorities
Archx	Yet another program for bundling up text files and mailing or posting them as a single file unit.

Fred Fish Disk 27

ABdemos	Amiga Basic demos; Caroly Scheppner.
NewConvertFD	creates .bmaps from fd files.
BitPlanes	finds addresses of and writes to bitplanes of the screen's bitmap.
AboutBmaps	A tutorial on creation and use of bmaps.
LoadILBM	loads and displays IFF ILBM pics.
LoadACBM	loads and displays ACBM pics.
ScreenPrint	creates a demo screen and dumps it to a graphic printer.
Disassem	Simple 68000 disassembler. Reads standard Amiga object files and disassembles the code sections. Data sections are dumped in hex. The actual disassember routines are set up to be callable from a user prog so instructions in memory can be disassembled dynamically. By Bill Rogers.
DvorakKeymap	Example of a keymap structure for the Dvorak keyboard layout. Untested but included because assembly examples are few and far between. By Robert Burns
Hypocycloids	Spirograph, from Feb. 84 Byte.
LinesDemo	Example of proportional gadgets to scroll a SuperBitMap.
MemExpansion	Schematics and directions for building your own homebrew 1 Mb memory expansion, by Michael Fellinger.
SafeMalloc	Program to debug 'malloc()' calls
ScienceDemos	Convert Julian to solar and sidereal time, stellar positions and radial velocity epoch calculations and Galilean satellite plotter. By David Eagle.

Fred Fish Disk 28

ABasic games by David Addison: Backgammon , Cribbage, Milestone, and Othello	
Cpp	DECUS 'cpp' C preprocessor, & a modified 'cc' that knows about the 'cpp', for Manx C.
Shar	Unix-compatible shell archiver, for packing files for travel.
SuperBitMap	Example of using a ScrollLayer, syncing SuperBitMaps for printing, and creating dummy RastPorts.

Fred Fish Disk 29

AegisDraw Demo	Demo program without save and no docs.
Animator Demo	Player for the Aegis Animator files
Cc	Unix-like front-end for Manx C
Enough	Tests for existence of system resources, files, and devices
Rubik	Animated Rubik's cube program
StringLib	
Vt100	VT-100 terminal emulator with Kermit and Xmodem protocols

Fred Fish Disk 30

Several shareware programs. The authors request a donation if you find their program useful, so they can write more software.

BBS	an Amiga Basic BBS by Ewan Grantham
FineArt	Amiga art
FontEditor	edit fonts, by Tim Robinson
MenuEditor	Create menus, save them as C source, by David Pehrson
StarTerm3.0	Very nice telecom by J. Nangano

(Fred Fish Disk#30 is free if requested when ordered with at least three other disks from the collection.)

Fred Fish Disk 31

Life	Life game, uses blitter to do 19.8 generations a second.
Mandelbrot	Version 3.0 of Robert French's program.
MxExample	Mutual exclusion gadget example.
RamSpeed	Measure relative RAM speed, chip and fast.
Set	Replacement for the Manx "set" command for environment variables,with improvements.
Tree	Draws a recursive tree, green leafy type, not files.
TxEd	Crippled demo version of Microsmith's text editor, TxEd.
VDraw	Full-featured drawing program by Stephen Vermeulen.
Xicon	Invokes CLI scripts from icon
Ticon	Displays text files from an icon.

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Fred Fish Disk 32

Address	Extended address book, AmigaBASIC
Calendar	Calendar/diary program, AmigaBASIC
DosPlus1	First volume of CLI oriented developer tools
DosPlus2	2nd volume of CLI oriented developer tools.
Executables only:	
MacView	Views MacPaint pics in Amiga low or high res, no sample pictures, by Scott Evernden.
Puzzle	Simulation of puzzle with moving squares.
ShowHAM	View HAM pictures from CLI.
Solitaire	ABasiC games of Canfield and Klondike, from David Addison.
Spin3	Graphics demo of spinning cubes, double-buffered example.
Sword	Sword of Fallen Angel text adventure game written in Amiga Basic.
Trails	Leaves a trail behind mouse, in Modula-2

Fred Fish Disk 33

3dstars	3d version of the "stars" program below.
Bigmap	Low-level graphics example scrolls bitmap with ScrollVPort.
Dbuf.gels	Double-buffered animation example for BOBs and VSprites.
DiskMapper	Displays sector allocation of floppy disks.
MemView	View memory in real time, move with joystick.
Oing	Bouncing balls demo
Sproing	Oing, with sound effects.
ScreenDump	Dumps highest screen or window to the printer.
Sdb	Simple database program from a DECUS tape.
Stars	Star field demo, like Star Trek.
TermPlus	Terminal program with capture, library, function keys, Xmodem, CIS-B protocols.
Vt100	Version 2.0 of Dave Wecker's VT-100 emulator, with scripts & function

Fred Fish Disk 34

Alint	Support files for Gimpel's 'lint' syntax checker
Blink	PD 'alink' compaible linker,faster,better.
Browser	Updated to FF 18 'browser', in Manx, with scroll bars, bug fixes.
Btree	b-tree data structure examples
Btree2	Another version of 'btree'
Calendar	Appointment calendar with alarm.
Less	File viewer, searching, position by percent, line number.
NewFonts	Set of 28 new Amiga fonts from Bill Fischer
Pr	Background print utility, style options, wildcards.
Requester	Deluxe Paint-type file requester, with sample.

Fred Fish Disk 35

ASendPacket	C example of making asynchronous I/O calls to a DOS handler, written by C-A
ConsoleWindow	C example of getting the Intuition pointer a CON: or RAW: window, for 1.2, by C-A.
DirUtil	Walk the directory tree, do CLI operations from menus
DirUtil2	Another variant of Dirutil.
FileRequester	Lattice C file requester module, with demo driver, from Charlie Heath.
MacView	Views MacPaint pictures in Amiga low or high res, with sample pictures, by Scott Evernden.
Plop	Simple IFF reader program
PopCLI	Sidekick-style program invokes a new CLI, with automatic screen blanking.
QuickCopy	Devenport disk copiers duplicate copy-protected disks.
ScrollPf	Dual playfield example, from C-A, shows 400 x 300 x 2 bit plane playfield on a 320 x 200 x 2 plane deep playfield.
SendPacket	General purpose subroutine to send AmigaDos packets.
SpriteMaker	Sprite editor, can save work as C data structure. Shareware by Ray Larson.
Tracker	Converts any disk into files, for electronic transmission. Preserves entire file structure. Shareware by Brad Wilson.
TriClops 3-D	space invasion game, formerly commercial, now public domain. From Geodesic Publications.
Tsize	Print total size of all files in subdirectories.
Unifdef	C preprocessor to remove given #ifdef'd sections of a file, leaving the rest alone. By Dave Yost
Vttest	VT-100 emulation test program. Requires a Unix system.

Fred Fish Disk 36

Acp	Unix-like 'cp' copy program
Clock	Updated version of clock on disk 15.
Csh	Manx 'csh'-like CLI, history, variables, etc.
DietAid	Diet planning aid organizes recipes, calories
Echo	Improved 'echo' command with color, cursor addressing
FixHunk	Fixs programs to let them run in external memory.
Fm	Maps the sectors a file uses on the disk.
KickBench	Docs, program to make a single disk that works like a Kickstart and Workbench.
Lex	Computes Fog, Flesch, and Kincaid readability of text files.
TunnelVision	David Addison ABasic 3D maze perspective game.
Vc	Visicalc-like spreadsheet calculator program.
Vt100	Version 2.2 of Dave Wecker's telecom program
YaBoing	Oingl style game program shows sprite collision detects

Fred Fish Disk 37

This disk is a port of Timothy Budd's Little Smalltalk system, done by Bill Kinnersley at Washington State University.

Fred Fish Disk 38

CSquared	Sep 86 Sci American, Circle Squared algorithm
FixObj	Strips garbage off Xmodem transfered object files
Handler	AmigaDOS handler (device) example from C-A
Hp-10c	Mimics a HP-10C calculator, written in Modula-2
IFFEncode	Saves the screen as an IFF file
IffDump	Dumps info about an IFF file
Jsh	BDS C-like CLI shell
NewStat	STATUS-like program, shows priority, processes
Reversi	Game of Reversi, version 6.1
UUdecode	Translate binary files to text, Unix-like programs
Vdraw	Drawing program, version 1.14
VoiceFiler	DX MIDI synthesizer voice filer program
Window	Example of creating a D OS window on a custom screen

Fred Fish Disk 39

AnsiEcho	'echo', 'touch', 'list', 'cls' written in assembler.
Display	Displays HAM images from a ray-tracing program, with example pictures.
Driver	Example device driver source, acts like RAM: disk
Xlisp	XLisp 1.7, executable only

Fred Fish Disk 40

Ahost	Terminal emulator with Xmodem, Kermit and CIS B protocols, function keys, scripts, RLE graphics and conference mode.
AmigaMonitor	Dynamically displays the machine state, such as open files, active tasks, resources, device states, interrupts, libraries, ports, etc.
Arc	Popular file compression system, the standard for transitting files
AreaCode	Program that decodes area codes into state and locality.
Blink	'alink' replacement linker, version 6.5
Cosmo	An 'asteriods' clone.
Dg210	Data General D-210 Terminal emulator
DirUtil	Windowed DOS interface program, V 1.4
DOSHelper	Windowed AmigaDOS CLI help program
PagePrint	Prints text files with headers, page breaks, line numbers
PopCLI	Starts a new CLI with a single keystroke, from any program, With a screen-saver feature. Version 2, with source.
SpriteEd	Sprite Editor edits two sprites at a time
X-Spell	Spelling checker allows edits to files

Fred Fish Disk 41

AmigaVenture	Create your own text adventure programs in AmigaBasic.
Csh	Version 2.03 of Dillon's C sh-like shell. Executable only
Dbug	Macro based C debugging package update to FF #2
DualPlayField	example from CBM, update to Intuition manual
GetFile	Heath's file requester, with source
LatXref	Cross reference of Lattice 3.10 header files
Lines	Line drawing demo program
SetFont	Changes font used in a CLI window
Vt100	Version 2.3 of the VT-100 terminal program.

Fred Fish Disk 42

This disk contains an Amiga version of MicroGNUEmacs.

Fred Fish Disk 43

BasicBoing	AmigaBasic program demos page flipping of a 3D cube
Bbm	Demo copy of B.E.S.T. Business Management System.
BbsList	A list of Amiga Bulletin Board Systems
Cc	C compiler frontends for Manx and Lattice C
Copper	A hardware copper list disassembler
InstIFF	Converts Instruments demo sounds to IFF sampled sounds
PopColours	Adjust RGB colors of any screen
SpriteClock	Simple clock is displayed on a sprite above all screens
ST Emulator	Non-serious Atari ST emulator
WBrun	Lets Workbench programs be run from the CLI
Wild	Two Unix shell style wild card matching routines

Fred Fish Disk 44

Icons	Miscellaneous icons
NewIFF	New IFF material from CBM for sampled voice and music files
RayTracePics	The famous ray-tracing pictures, from FF#39, now converted to IFF HAM format for *much* faster viewing.
ViewILBM	Displays normal and HAM ILBM files

Fred Fish Disk 45

Clue	Clue board game
Make	Another 'make', with more features
Pictures	Miscellaneous pictures
Update	Updates older disk with newer files from another disk
WhereIs	Searches a disk for files of given name

Fred Fish Disk 46

Asm	Shareware 68010 macro assembler, ROM Kernal Manual compatible
CheckModem	'executv' file program detects presence of modem
Egad	Gadget editor from the Programmers Network
Jive	Transforms a file from English to Jive.
MyJib	A binary only copy of Ma tt's alternate runtime library. Author: Matt Dillon
ProffMacros	Subset Berkeley 'ms' and 'mm' macros for 'proff'
ValSpeak	Transforms a file from English to Valley Speak.

Fred Fish Disk 47

3D-Arm	Simulation of a robotic a rm, very good graphics, teaching tool, including C source.
Juggler	Eric Graham's stunning HAM animation of a robot juggler
VT-100	Version 2.4 of Dave Wecker's terminal emulator, with Xmodem and Kermit file transfer protocols

Fred Fish Disk 48

Bru	Alpha version of a hard disk file archiver
Comm	Version 1.30 of a terminal emulator with phone directories
Csh	Version 2.04 of Matt Dillion's Unix 'csh'-like CLI replacement, including Lattice & Manx C source
Diskperf	Disk benchmark program for Unix and Amiga
Du	Computes disk storage of a file or directory
MemWatch	Program to watch for programs that trash low memory. It attempts to repair the damage, and puts up a requester to inform you of the damage. From the Software Distillery.
Profiler	A realtime execution profiler for Manx C programs. Includes C source.

Fred Fish Disk 49

Cycloids	Update of electronic spirograph from disk 27
DirUtil	Enhanced version of DirUtil from disk 35
MultiDef	Scans a set of object modules and libraries searching for multiply defined symbols
MyUpdate	Disk update utility with options for stripping comments from C header files, and interactive verification of the updating process
Plot	Computes and displays 3 dimensional functions in hires
Polygon	Moire type pattern generator with color cycling
QMouse	Queries whether a mouse button is pressed. This can give a return code that can customize a startup-sequence based on whether a mouse button was pressed.
Touch	Example of setting the datestamp on a file, using a technique from Commodore-Amiga
Trees	More extensive version of the trees program on Disk 31

Fred Fish Disk 50

Asm	Version 1.1 of a shareware 68000 macro assembler, compatible with the Metacomco assembler. This includes an example startup module and more Motorola mneumonics.
BreakOut	A brick breakout game, uses 3-D glasses
DiskZap	Version 1.1 of a program to edit disks and binary files
FirstSilicon	A smart CLI replacement with full editing and recall of previous commands
Missile	A Missile Command-type game, with sound, in assembler
PerfectSound	Sound editor for a low-cost sound digitizer
Sizzlers	Graphics demos
UnixArc	Ver of 'arc' for Unix System V machines,in C
Wombat	Version 3.01 of Dave Warker's terminal emulator

Fred Fish Disk 51

Bison	GNU for Unix 'yacc', working update to FF4
Compress	Update to the file compression program on Disk 6
Cos	"Wheel of Fortune"-type game in AmigaBasic
DiffSed	Unix-like 'dif' and 'ssed' for finding the differences between two files, and then recreating the other, given one file, and the list of differences.
Sq, Usq	Portable versions of the CP/M squeeze and unsqueeze

Fred Fish Disk 52

Assign	Replacement for AmigaDOS 'assign' command in C
Fractal	Makes random fractal terrains
Poly, HAMPoly	Workbench-type demos for making polygons in lores and HAM
MxGads	Example of mutual exclusion gadgets with GadgetText
Tek4010	Tektronix 4010 terminal emulator
VDraw	Versions 1.16 and 1.19 of a Deluxe Paint-like drawing program

Fred Fish Disk 53

Animations	Demo animations with player program for Aegis Animator
ARCre	Creates rename scripts for files with long names, so they can be easily 'arc'ed and un'arc'ed.
ARP	Preliminary AmigaDOS replacements for 'break', 'cd', 'chmod', 'echo', 'filenote' and 'makedir'
Compiler	Not fully ported to the Amiga, this is a 68000 C compiler. It wil produce simple assembly language output, but needs a lot of work.
Spreadsheet	Update with source of the 'vc' spreadsheet on disk 36
TarSplit	Port of program to split Unix 'tar'archives
UUencode	Utilities to encode and decode binary files for ASCII transmission, expanding them by 35%

Fred Fish Disk 54

Hanoi	Solves Towers of Hanoi Problem in it's own Workbench window. by Ali Ozer
ISpell	Port of a Unix screen oriented, interactive spelling checker. (Expansion RAM required) by Pace Willisson
Ing	A Screen of lots of bouncing little windows by Leo 'Bols Ewhac' Schwab
Lav	Displays number of tasks in run queue, averaged over last 1, 5, and 15 minute periods. by Willaim Rucklidge
MIDITools	Programs to play/record through the MIDI I/F. by Fred Cassirer
MoreRows	Program to make the Work Bench Screen larger than normal. by Neil Katin and Jim Mackraz
Tilt	Program to make your Amiga look like it didn't pass vibration testing. by Leo " Bols Ewhac' Schwab

Fred Fish Disk 55

Csh	V2.05 of Matt Dillon's csh like shell (Modified for Manx C). by Matt Dillon, Modified by Steve Drew
NewStartups	New C Startup modules:
AStartup.asm	with 1.2 fixes and better quote handling.
TWStartup.asm	opens a stdio window, using user specs. by Commodore, posted to BIX by Carolyn Schepper
Palette	Change another program's screen colors. by Carolyn Schepper
PipeDevice	Allows the standard output of one process to be fed to the standard input of another. by Matt Dillon
ScreenSave	Save a normal or HAM mode screen as an IFF file. by Carolyn Schepper
ShanghaiDemo	Demo of the Activision game Shanghai.
SoundExample	A double buffered sound example for Manx C. by Jim Goodnow
Vsprites	A working vsprite example. by Eric Cotton
Vt100	V2.6 of Dave's Vt100 terminal emulator with kermit and xmodem. by Dave Wecker

Fred Fish Disk 56

ClipBoard	Clipboard device interface routines, to provide a standard interface. by Andy Finkle
ConPackets	Demos the use of DOS Packets, ConUnit, etc. by Carolyn Schepper
GetDisks	Program to find all available disk device names and return them as an exec list. by Philip Lindsay
GetVolume	Program to get volume name of the volume that a given file resides on. by Chuck McManis
Icon2C	Reads an icon file and writes out a fragment of C code with the icon data structures. by Carolyn Schepper
MergeMem	Program to merge the MemList entries of sequentially configured RAM boards. by Carolyn Schepper
mCAD	An object oriented drawing program, V1.1 by Tim Mooney

Fred Fish Disk 57

Replaced by FF97 Due to Copyright problems

Fred Fish Disk 58

ASDG-rrd	Extremely useful shareware recoverable ram disk. by Perry Kivolowitz
BigView	Displays any IFF picture, independent of the physical display size, using hardware scroll. by John Hodgson
EGraph	Reads pairs of x and y value from a list of files and draws a formatted graph. by Laurenece Turner
HyperBase	Shareware data management system. V1.5
MemClear	Walks through the free memory lists, zeroing free memory along the way. by John Hodgson
NewZAP	A third-generation multi-purpose file sector editing utility. V3.0 by John Hodgeson
RainBow	A Maurauder-Style rainbow generator. by John Hodgson
SMUSPlayers	Two SMUS plays, to play SMUS IFF music formatted files. by John Hodgson
View	A tiny ILBM viewer by John Hodgson
WBdump	JX-80 optimized workbench printer that does not use DumpRPort. by J. Hodgson

Fed Fish Disk 59

Browser	Update to browser program on disks 18 and 34. S-E
Browser2	Another different browser program. E
Clock	Clock program with fonts, colors. E
Dme	Dillon text editor V1.22 for programmers.ED
DropCloth	Puts pattern on Workbench backdrop,ED
DropShadow	Puts shadows on Workbench windows,E-D
FixWB	Similar to DropCloth, but doesn't work yet. S-D
mCAD	Object-oriented drawing program, version 1.2.2. Much improved over disk 56.
Robotroff	Demo of animated pointers on Workbench. S-E-D
Supermort	General compounding/amortization loan calculator. E-D

Fred Fish Disk 60

Various shareware and freeware programs	
Blitz	Memory resident file viewer. Very fast. E-D
BlitzFonts	Makes text output faster. E-D
HandShake	Terminal emulator with VT52/VT100/ VT102support. E-D
Med	Mouse-driven text editor version 2.1. E-D
PrtDrvGen	Generates printer drivers, version 1.1.S available from author. E-D
Show	Slideshow-like IFF viewer, V2.1. E-D
Uedit	Customizable text editor V2.0. E-D
Ueturbo	Example Uedit setup macros. S-E-D

Fred Fish Disk 61

ATPatch	Patches Transformer to work under AmigaDOS 1.2. S-E-D
FillDisk	Writes zeroes to free blocks on a disk for security. S-E-D
LPatch	Patch for programs that abort when loading under AmigaDOS 1.2. S-E-D
MicroEmacs	Conroy MicroEmacs V3.8b, newer than disk 22. S-E-D
PearlFont	Like Topaz, but rounded edges.
Terrain	Generates fractal scenery. S-E-D
VSprites	Makes 28 Vsprites, from P&E Book.

Fred Fish Disk 62

This is a port of the Unix game 'Hack', by the Software Distillery, version 1.0.3D.

Fred Fish Disk 63

This is a port of the Unix game 'Larn', by the Software Distillery, version 12.0B.

Fred Fish Disk 64

This is an offical IFF specification disk from Commodore, an update to disk 16.

Fred Fish Disk 65

Bawk	Unix text processor, like 'awk'. Doesn't work, but source is included. S-E-D.
MWB	Example of rerouting Workbench window open calls to another custom screen. Version 1.01, S-E-D
CloseWB	Example for closing a custom Workbench screen. S-E-D
Cookie	Generates one-line fortune-cookie aphorisms. S-E-D
JTime	Build-your-own mouse port clock.
MenuBuilder	Creates C source files for menus, based on text descriptions. S-E-D.
NewPackets	CBM tutorial on new packets and structures in AmigaDos 1.2.
PascalToC	Pascal to C translator, not so great. S-E-D
Prep	'ratfor'-like FORTRAN preprocessor. S-E-D
RunBack	Starts programs from CLI, allowing CLI window to close. E-D

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SunMouse This program automatically clicks in windows when the mouse is moved over them. V1.0, E-D

Fred Fish Disk 66

AmScsi Preliminary plans for a SCSI disk controller board.

Asm68k Macro assembler, version 1.0.1. E-D

Assigned Example for avoiding DOS insert-disk requester, by scanning the list of 'assign'ed names. S-E-D

Dk Pretends to eat away at CLI window. S-E-D

Flip Flips whole screen as a joke. S-E-D

Foogol Foogol cross-compiler generates VAX assembly code. S-E-D

Free Prints amount of free space on all drives.S-E-D

MallocTest malloc/free memory test program. S-E-D

Melt Pretends to melt the screen. S-E-D

Nart Graphic flying string demo. S-E-D

Purty Easy way to set printer attributes from Workbench. E-D

RayTracer Simple ray tracing program. E-D

SendPackets Updated CBM examples of packet routines on disk 35. S-E-D

SnapShot Memory resident screen dump. E-D

TagBBS Shareware BBS system, version 1.02.

Fred Fish Disk 67

AmCat Shareware disk cataloging program.

AmigaSpell Shareware Intuition spelling checker, V2.0. E-D

Bouncer 3-D bouncing ball written in MultiForth, SED

Comm Terminal program version 1.33, E

Dux5 Another version of DirUtil. S-E-D

HexCalc Hex, octal, & decimal calculator. E-D

Icons Various big and alternate image icons.

Mandala Mandala graphics and sound. E

PersMait Demo shareware personal file manager.

RSLClock Menu bar clock version 1.3. E-D

RTCubes Graphics demo of 3D cubes. E-D

Wheel "Wheel of Fortune"-type game,AmigaBASIC

Fred Fish Disk 68

This is version MG 1b of the MicroGNUEmacs. Source and executable areincluded, as well as source for other computers besides the Amiga.

Fred Fish Disk 69

Asm68k Macro assembler, v1.0.3, E-D

BlitLab Blitter exploring program, in C, S-E-D

Conman Replacement console device handler adds editing and history to any application that uses CON:, v0.9, E-D

Console Replacement console routines, in C, S-E-D

Dk Decays the screen bit by bit, update to disk 66, in Modula-2, S-E-D

Frags Displays memory fragmentationby listing the size of free memory blocks, in C, S-E-D

IconType Change the type of an icon, in C, S-E-D

Make 'make' in Manx C, S-E-D

MonProc Monitors processes for packet activity, in C,S-ED

MouseClock Mouse pointer into a digital clock,in C,SED

Sb Browses system structures, from Transactor magazine, v1.0, in C, S-E-D

Spew Generates 'National Enquirer'-type headlines from rules file. In C,S-E-D

Spool Three programs to demonstrate multitasking & spooling in a printer spooler. In C, v1.2, S-E-D

Wc Counts words ala Unix 'wc', but faster, in C,S-ED

Fred Fish Disk 70

This is a disk of shareware programs.

AmigaMonitor Explores state of the system, v1.13

Arc Standard file compressor and librarian, v0.23, a port of MS-DOS v5.0. E-D

BlackBook Phone book program.

DoTil Intuition-driven file manipulator program,v2.0.

GravityWars Game of planets, ships and black holes,v1.03.

Jobs Alternate user interface to CLI and WB, v2.1.

Lens Magnifies area around mouse, shows it in a window, v1.0.

Life-3d 3D version of the classic cellular-automaton game, v1.2.

Logo Logo language interpreter

SetKey Demo keymap editor, v1.0

Vpg Makes displays for aligning video monitors, v1.0.

Fred Fish Disk 71

AirFoil Makes airfoils using the Joukowski transformation, in C, S-E-D

Amiga Basic Miscellaneous programs including 3D plot program, a kaleidoscope, C-A logo drawing program file comparison utility string search program, S-E-D

Blocks A variation of "lines", but with variable color blocks. E-D

Comm Great terminal program, v1.34, E-D

DiskX Utility for exploring file system.E-D

Fpic Simple image processing program that operates on IFF pictures, with several filters, merging images, E-D

IconMk Makes icons for files , v1.2a, E-D

Icons New icons

NewFonts Two new fonts; 'shalt18', an electronic ciruit element font, and 'ibm5', a PC-like font.

PetCLI An AmigaBASIC CLI shell program.

PWDemo Demo of the commercial product PowerWindows,v1.2. It aids creation of custom windows, menus, and gadgets, giving C or assembly source. E-D

Rot Creates and animates 3-D objects, v0.5, E,D

TimeSet Sets time from Workbench, E-D

Fred Fish Disk 72

This is a disk of IFF pictures.

Fred Fish Disk 73

Add Customizes existing program menus with Amiga-key shortcuts. Also includes 'until', which waits until a given window is created. Shareware, in C, S-E-D.

AutoIconOpen Fools WB into thinking mouse has double-clicked icons. In C, S-E-D

Dio Generic Exec device interface code for opening libraries, getting multiple I/O channels, asynchronous operations, etc. In C, S-E-D.

Dissolve Slowly displays IFF files, ala Nov 86 Dr. Dobb's program. In C, S-E-D

DTerm Flexible, reprogrammable terminal program v1.10, E-D

Expose Re-arranges windows so that at least one pixel of menu bar gadgets are exposed. InC, S-E-D.

Lit Scans a text file, converts to C-style printable strings.C,v2.0, S-E-D

Lmv "Long Movie", program views series of IFF picts in quick succession, upto 19 fps. Shareware, E-D

MouseOff Mouse pointer disappears after ten seconds of non-use. In C, S-E-D

ParOut Examples of controlling parallel port with resources instead of the PAR: device.In C,S-E-D

PenPalFont Child-like font.

RunBackGround Similar to RunBack on disk 66, runs program from the CLI allowing the CLI window to close. In C,S-E-D

SnapShot Screendump utility,update FF 66.E-D

TypeAndTell Example installs a device handler before Intuition, and speaks each key as it is pressed. In C and assembler, S-E-D

Xplor Prints info about system lists, in assembler,S-E-D

Fred Fish Disk 74

Cled Edits and recalls CLI commands, v1.3, E-D

Control Intercepts graphic printer dump calls and accesses color map, width,and screen resolution. C,S-E-D

Dme Simple WYSIWYG text editor for programmers,v1.25. Update of FF 59.E-D

DropShadow WB dropshadows, v2.0.UpdateFF59. E-D

Funds AmigaBASIC prog tracks mutual or stocks-D

Less Text viewing program, like Unix "more", v1.1, update to disk 34. S-E-D

Makemake Scans C source files and constructs a vanilla 'makefile' in the current directory. S-E-D

mCAD Object-oriented drawing prog. v1.2.4, update to FF 59.Shareware, E-D

Random Simple random number generator in C. S-E-D

TDebug Monitors devices by intercepting Exec SendIO() and DoIO() vectors, in C, v1.0, S-E-D

Units Converts measurements in different units, includes "chart" option, in C, S-E-D

XCopy Replacement for AmigaDOS 'copy', doesn't change the date, uses Unix wildcards. E-D

Fred Fish Disk 75

Bezier Play with Bezier curves points and granularity, S-E-D

BSplines Play with b-splines, as above, S-E-D

Comm C source for Comm terminal program v1.34. S-E-D

Copy Replacement 'copy' command v1.0, preserves date, in C, S-E-D

Diff Simple 'diff' in C, S-E-D

DuM2 Another DirUtil in Modula-2, v1.5, S-E-D

Eless Fast 'dir' program in C, S-E-D

Fd Faster 'eless' in C, S-E-D

HardCopy Sends a transcript of a CLI session to a file, in C, S-E-D

MouseOff Update FF73, turns off mouse pointer, S-E-D

SetFont Changes the font in a Workbench screen, v2.0, S-E-D

SpeedDir Another fast 'dir', in assembler, S-E-D

Fred Fish Disk 76 & 77

These are disks 1 and 2 of Chris Gray's Draco distribution for the Amiga. Draco is a compiled, structured language reminiscent of both C and Pascal. A full interface to AmigaDOS and Intuition is supplied. Be sure to get both disk 76 and 77.

Fred Fish Disk 78

Cycles Cycle game like "Tron", v1.0, E-D

EOMS Experts Only Mercenary Simulator game, E-D

MandelVroom Mandelbrot generator with enhanced palette controls, fixed/floating point, presets, v1.50, in Manx C, S-E-D

Fred Fish Disk 79

AsmTools CLI tools in assembler: echo, loadit, mounted, setlace, why; S-E-D

AssignDev Give devices multiple names, in C, S-E-D

AuxHandler Example of a dos handler that allows use of a CLI via the serial port. Includes source. Author: Steve Drew

Cmd Redirects printer output to a file, in C, S-E-D

Info AmigaDOS 'info' replacement, in C and assembler, S-E-D

Kill Removes a task and its resources, in C,S-E-D

M2Error Displays errors from TDI Modula-2 compiles, S-E-D

MonProc Update to process packet prog. from FF69,in C,S,E,D

Mounted Program for testing if a drive is present, in a script In C, S-E-D

Nro Another 'roff'-style text formatter, in C, S-E-D

ParTask Finds parent task, in C, S-E-D

QueryAny For scripts, asks a question, accepts Y/N, gives return code. In assembler, S-E-D

ScnSizer Resets pref settings for screen size, in C,SED

SharedLib Example, shared lib, in C & assembler, S-E-D

Task Simple CreateTask() example in C, S-E-D

Uw Unix Windows client v1.0, in C, S-E-D

Who Lists tasks on ready and wait queues, in C, S-E-D

Fred Fish Disk 80 (see Fred Fish 90)

Fred Fish 80 has been withdrawn due to copyright problems.

Fred Fish Disk 81

Asm68k V1.1.0 of a macro assembler

AutoFacc Shrinks the FACC window and moves it to the back

Brushes 53 custom IFF brushes of electronic symbols

CheckIFF Checks structure of an IFF file CledV1.4 update FF74 of a simple CLI

Conman Replaces console handler to add editing and history to many programs

Fonts Miscellaneous fonts

Icon V6.0 of the Icon programming language

KeyLock Freezes the keyboard and mouse until pass word entered.

ScatDisplay hack created from "Ing"

Smush Smushes an IFF file.

Target Each mouse clikc becomes a gunshot

Fred Fish Disk 82

Adventure Port of the classic Crowther and Woods game

AmicTerm V0.50 of a telecommunications program, with scripts, redial, beeps, enhanced file requester

D2D-Demo Demo version of Disk-2-Disk by Central Coast Software

DX-Synth Voice filer program for Yamaha DX series synthesizers, update to disk 38

DiskMan V1.0 of another DirUtil program

Icons Miscellaneous new icons

Panl Universal MIDI patch panel, v1.2

Rocket Another Workbench hack, plays Lunar Lander

Sand Game of sands following your pointer.

Fred Fish Disk 83

This disk contains a demo version of TeX from N Squared. It is limited to small files, and the previewer can only display ten pages or less, and only a small number of fonts are provided.

Fred Fish Disk 84

AudioToolsPrograms from Rob Peck's July/August Amiga World article

BlitLab Blitter experimentation program, V1.2, update to FF69

Ed Simple editor, similar to Unix 'ed', based on the editor in Software Tools.

GravityWars Game of planets, ships and black holes, v1.04, update to disk 70.

HunkPad Adds legal padding to executables for Xmodem transmission.

PipeHandler An AmigaDOS pipe device which supports named pipes and taps. V1.2

PopCLI V3.0 of a hot-key to invoke a CLI window, with screen blanker, update to disk 40.

Requester Update FF34, file requester similar to DPaint.

ScottDevice V33.1 of a 'mount'able MicroForge SCSI driver.

Viacom Another Schwab hack, makes TV-like static on screen.Parody

Fred Fish Disk 85

Csh V2.06 of Dillon's 'csh'-like shell

FileReq Source to wildcard file requester

Hide Hides expansion memory from programs

ImageTools Shareware tools to manipulation IFF images

LowMem ServerShared library to aid in low memory situations

Plot6 A star plotting program with source.

RawIO Example of setting raw mode on standard input

Rocket Lunary Lander for Workbench, with source.

VMore "more"-like text viewing utility, v1.0 SE

Vnews Simple Unix news reader.

Fred Fish Disk 86

AutoPointAuto-selects window under the mouse pointer, with screensaver.

ClickToFront Double-clicks in window brings it to front, v1.1, S-E-D

Cmd V3.0 of a tool to redirect printer output toa file.

FileIISG-Demo Demo of Softwood File IIsg, a database manager with sound and graphics.

Fred Fish Disk 87

AdvSys Adventure system from Byte May 1987, v1.2 E-D

AutoIconOpen Fools Workbench to open disk icons, V1.2 update to disk 73, S-E-D

Claz Converts IFF files to PostScript, V2.0, SED

Commodi tiesMackraz's Commodities Exchange, an exec library to manage input handler, v0.4

Diff Update to disk 75 of Unix-like 'diff', S-E-D

Dme V1.27 of Dillon's text editor, update FF74,E-D

DropShadow V2.0 of prog. that puts shadows on Workbench, S-E-D

Elib Shared library example in Manx C.

ID-Handler An AmigaDOS device handler generates unique identifiers, V1.0, S-E-D

Install Alternate AmigaDOS 'install' programs,SED

MemWatch Waits for low memory trashing, V2.0, SED

MovePointer Moves pointer to given location, S-E-D

MoveWindow Move window to given location, S-E-D

MunchingSq Munching Squares hack, S-E-D

PalTest Test to see if this is a PAL machine, S-E-D

Sc Generates random scenery, S-E-D

Tek4695 Tek4695 printer driver

WBDualPF Example of dual-playfield screen, update FF41, S-E-D

WarpText Fast text rendering routines, S-E-D

Yaiff rExample IFF reader, S-E-D

Zoo A file archiver like "arc", v1.42A, E-D

Fred Fish Disk 88 (see Fred Fish 89)

FF Disk 88 has been removed due to copyright problems

Fred Fish Disk 89 (replaces Fred Fish 80)

DirMaster Disk catalogue program, V1.0a, E-D

FuncKey Shareware function key editor, V1.01, E-D

MFF-Demo Demo of MicroFiche Filer database prog

ScreenShift Adjust screen position ie Preferences,SED

Snake Bouncing squiggly lines demo, S-E-D

AutoEnguirer screen contraption requester improvement S-E-D

DemoLition Display Hack S-E-D

Fred Fish Disk 90 (replaces Fred Fish 80)

AmiGazer Night sky viewer of 1573 stars, set date, time, day. E-D

CardFile AmigaBasic card file study aid. E-D

Conman Console handler replacement gives line editing and history to most progs, v0.98,ED

IMandelVroom Slight update to disk 78 Mandelbrot program, E-D

NewDemos Replacements for lines and boxes demos that take less CPU time, E-D

Othello Game of Othello, E-D

PrinText Displays text files with gadgets, speech, IFF display, v1.2, E-D

PrtDrvGen Automatic printer driv. generator,v2.2b,ED

RainBench Cycles colors of WB backdrop or text. ED

ShortCut Makes single-key shortcuts for entering commonly typed CLI commands,&custom macros. E-D

ShowPrint Displays and prints all sizes of IFF pictures & controls printer output styles, v2.0 E-D

Sizzlers Graphics demos, v1.7.0, E-D

Timer Small Workbench timer counts time and $/ minute, E-D

Fred Fish Disk 91

Adventure Definition Language (ADL) a superset of an older language called DDL by Michael Urban, Chris Kostanick, Michael Stein, Bruce Adler, and Warren Usui. ADL enhancements by Ross Cunniff. Included are sources to the ADL compiler, interpreter, and debugger. Binaries combined by Ross with Lattice 3.03. CLI enviornment only. Documentation is available from the authors.

Fred Fish Disk 92

As6502 portable 6502 assembler, C source, by J. Van Ornum, Amiga port by Joel Swank

Bawk Text processor update from FF65 inspired by UNIX awk. Searches files for patterns, performs actions based on patterns. By Bob Brodt; Amiga port by Johan Widen

HunkPad update of FF84 version. by J. Hamilton,pads an object file to a multiple of 128 bytes for better xmodem transfer. S E

Less Like Unix "more", better, version 1.2 update of FF74. Scrolls Back and f orward. S E by Mark Nudelman, Amiga port by Bob Leivian.

Ndir Library that implements the 4BSD unix dir access routines by MikeMeyer. S

Parse Recursive descent expression parcer, computes, and prints expressions. includes transcendental function support. c Source included. by J Olsen

Shar Two programs to pack and unpack shell archives includes C source. by Fabbian G. Dufoe

SmallLib 8 times smaller Amiga.lib replacement, binary only. by Bryce Nesbitt

UUencode Encode/decode binary files for e mail or text-only methods. Update of FF53, includes checksum technique, compatible with older versions, plus transparent to older versions options. By Mark Horton, modified by Alan Rosenthal & Bryce Nesbitt.

Fred Fish Disk 93

Dme Version 1.27 WYSIWYG programmer editor. Not a word processor. Includes key mapping, fast scro-lling, title-line statistics, multiple windows, ability to iconify windows. Update of FF87, SE. by Matt Dillon

MicroEmacs Version 3.8, update to FF61 includes source. Orig by Dave Conroy modifications by Daniel Lawrence

Fred Fish Disk 94

AudioTools Demo programs from Rob Peck's July/Augusit issue of AmigaWorld on accessing the audio device. V2,update of FF84. S. by Rob Peck

ClickUpFront Similar in function to ClickToFront prog (FF86), bring windows totront by clicking on any part of them. V 1.0. by Davide Cervone SE

HeliosMouse Automatically activate a window simply by moving the mouse pointer into the window. V 1.0. Includes source. By Davide Cervone

IFF2Ps Convert any IFF file to postscript for printing or viewing on a postscript compatible device. Version 1.2, by William Mason and Sam Paolucci E

ModulaTools Various Modula 2 prog. routines. by Jerry Mack

Terrain3d Pseudo-random 3d relief scenery generator, update of "sc", FF87. by Chris Gray, 3d by Howard Hull

Fred Fish Disk 95

Cmd redirects the serial.device or parallel. device output to a file. Capture print jobs, debug or "offline" printing.V4 By C Scheppner SE

CygnusEdDemo Demo of CygnusSoft's CygnusEd editor, a multiplefile, multiple feature editor.Includes demo 3.0 of MandFXP. by CygnusSoft Software E

Gomf "Get Outa My Face" makes the Guru go away to allow clean-up & shutdown more cleanly. V 1.0, by Christian Johnsen E

Journal records sequence of mouse & keyboard events, stored in a file for future playback. Good for demos or documtenting bugs. E. by D. Cervone

MergeMem attempts merging of MemList entries of sequentially configured ram boards. Allows allocating a section of memory which spans both boards. V 2, update of FF56. by Carolyn Scheppner SE

PrinterStealer Asimilar to "Cmd", allows diversion of output destined for printer to a file. Binary only, Source aval. from authors. by A. Livshits & J-M Forgeas

Record-Replay similar to "Journal", records and plays back mouse and keyboard events. B only. source avail. from authors, Alex Livshits & J-M Forgeas

Fred Fish Disk 96

AnimPlayer Animation reader and displayer by the combined efforts of Videoscape, Sculpt3D, Silver, Forms-In-Flight, and Animator:Appreticeby M Hashetal.

Chess Amiga port, non-Amiga interface. High playability. V 1.0, S. by J. Stanback, Amiga port by B. Leivian

Hackbench provides source for WB-Likeprog, for experimentation & validation of new interface ideas. Not a WB replacement. by Bill Kinnersley

Label Print labels with arbitray text. V 1.3, Source available from author, M.Hansen

LineDrawer Produces line drawings based on drawing commands stored in a text file. Includes demo that draws an outline map of the USA and state borders. V1.0, SE. by John Olsen

PopUpMenu Example code implementing pop-up menus, reasonably compatible with Intuition menus.SE. by Derek Zahn

Tek4695 Tektronix 4695/4696 printer driver. SE. by P Staub

TimeRam Fast and Chip ram test prog,E by B Takahashi

WarpText Fast text rendering routines, to be linked with application progs.Text display "as fast or faster than 'blitz'". V2.0 update of FF87, S by Bill Kelly

Fred Fish Disk 97

Replaces FF57 for Copywrite problems

CutAndPaste Implementaions of Unix cut and paste commands. by John Weald

GraphIt Program to plot simple functions in 2 or 3 dimensions. by Flynn Fishman

Juggler V1.2 of robot juggler animation. Uses HAM mode and ray tracing. by Eric Graham

MouseReader Shareware program to read text files & view IFF files using only the mouse. by William Betz

Splines Prog to demonstrate curve fitting & ren-dering techniques. by Helene (Lee) Taran

Shm Graphics demo, approximately simulates the motion of two interacting pendulums. Includes S by Chris Ediss

Fred Fish Disk 98

Access 16 color terminal program based on Comm V1.,34. Includes Macro window, custom gadgets, colorized menus, etc. V. Beta 0.18 by Keith Young ,comm by D.J.James. E.

Backup Writes AmigaDos disks as the backup destin-ation. recover files from the backup disk. Requires manual decisions on disk structure. by Alan Kent SE

DCDemo DishCat 2.3, a disk catalog program, demo limited to cataloging 100 files at a time. by Ed Alford, MicroAce Software

HdDriver WD-1002-05 hard disk controller driver. Card capable of maintaining 3 hard disks and 4 floppies, the driver is capable of only one hard disk. by Alan Kent SED

©Base Quick-Base, a "MailBase Management utility", define and maintain a maximum of 200 records per file. by Kevin Harrise E

Thai Thai language quiz program. Speak or type english/Thai sentences from supplied file. by Alan Kent SE

Fred Fish Disk 99

A-Render Version .3 a Ray- Tracing Construction Set for the Amiga Computer by Brian Reed ED

Fred Fish Disk 100

Berserk Must see animation, by Leo Schwab

Conman Console handler replacement, provides line editing and command line histories transparent to application prog uses CON: windows. Shareware V1.0 by W Hawes. E.

WBLander Workbench display hack game, upgrade of "Rocket" on FF85, now with sound effects. By Peter da Silva. E

Fred Fish Disk 101

CirPlane Circular plane generator for VideoScape3D. Generates a clockwise circular polygon with the specified number of vertibles. V1.0 by T Floryan SE

IconAssembler Change Workbench Icons with IFF-brush files by Stefan Lindahl E

Microspell Standalone spelling checker scans text files and reports errors. 1000 common word list, 43,000 word main dictionary with multiple user dictionary support. Interfaces with MicroEMACS 3.9 with an emacs macro to step through the source file, stopping at suspect words and allowing the user to option. V1.0 by Daniel Lawrence, SED

Midi midi library and utility set. Includes Midi monitor, routing utility, status utility, and more. by Bill Barton SED

PsIntrp Postscript Interpreter reads and previews files on screen. by Greg Lee S(assy)E

StartUps Three C startup file replacements for standard Astartup.obj and LStarup.obj. Options include (1) BothStartup.obj, for the WorkBench programs or CLI programs with or without command line parameters. (2) WBStartup.obj, for WorkBench programs or CLI programs that require no command line parameters. (3) CLIStartup.obj for CLI programs that require command line parameters but do not need to be WorkBench runnable. by Bryce Nesbitt SE

Fred Fish Disk 102

Dbug Machine independent macro based C de-bugging package. Update FF41. by F Fish profiling support by Binayak Banerjee SE

Match-stuff Heavy duty text pattern matching stuff. includes simple match text replacement capability. By Pete Goodeve

Sectorama Recover lost or damaged data from floppy or hard disks or repair a damaged volume. by David Joiner E

SliiCon Smart input line interpreter with window for full editing. Upgrade FF50 by P Goodeve., E

Xicon Use icons to call up scripts containing CLI commands. V2.0 upgrade of FF31.by Pete Goodeve E

Fred Fish Disk 103

AvlTrees Library and test prog. implement routines for creating and using trees held in memory.S.

Calc A programmable RPN calculator.

Cref A C cross ref. prog. S.

DosKwik A pair of progs. allows you to save files to one or more floppies for quick loading. Doesn't store Dos format.

IntuiDos A prog. to improve control and handling of the material on all disks in 'CLI-area' .

MFF-Update A text import util. for MicroFiche Filer (demo on FF 89) and updates to some PD disk library databases.

Pack-It Takes all files the files and dirs. on a disk & packs them into a single file. for modem.

Sol Amiga version of solitaire.

Fred Fish Disk 104

Analyticalc Is a large and powerful spreadsheet prog.

Fred Fish Disk 105

AsmProgs Misc. assembly tools. Includes some S.

BasicProgs LeastSquare solves least square probs ,graphs results,S.

Bison A replacement for unix "yacc" command. S.

Dmouse Another prog in the tradition of display hacks". S.

FlamKey Allows keyboard and mouse inputs to be locked until a password is entered.

GravityWars Game of planets,ships &black holes, v2.0 ,FF84 update.

IPo2C A util. to write a C-lang definition to mimic the intuition pointer.S

Pere-et-Fil Ex. of creating & using reentrant processes. S.

Record Replay Similiar to "Journal" v2.0 update to FF95.

Fred Fish Disk 106

Funckey Shareware function key editor, v1.1update to FF69. Source avail. from author(Anson Mah).

MoreArt A small selection of some Amiga artwork.

QuickFlix An IFF slideshow and cel animation prog,v0.13.

RistiNolla A Finnish game. Also called Go-Moku. v1.0

Fred Fish Disk 107

Csh V2.07 of Matt Dillon's csh like shell.S.

Diff A util.,similiar to other common "diff" programs.S.

ProSuite Provides ex. code of facilities such as FileIO Requester, XText, DoRequest. & tutorial on how to program the Amiga. Book 1.01.S

SVTools Some useful tools. S.

Fred Fish Disk 108

AList Dir listing prog. based on LD4 prg S

DirMaster Disk cataloger. v1.0b, update to FF89. S.

Dots-Perfect Printer Driver for an Epson MX80 printer with upgrade kit installed. S.

MonIDCMP Lets you monitor the IntuiMessages that pass through an IDCMP window. Prints the message class,mouse coordinates,qualifier values. Great for debugging. S.

PrintPop A util. to send common control settings to PRT: S.

Sectorama Utilities to recover lost or damaged data from floppies & hard disks. v1.1, an update toFF102.

Tek Vt100 emulator for a Tektronix 4010/4014. (V2.6) update to FF52. S.

Zoo File archiver, like "arc". v1.24B. update to FF87

Fred Fish Disk 109

Machine A new animation.

SimCPM A CP/M sim,simulates 8080 along with h19 emulationS.

UUpc Hook up your Amiga as a usenet node. S.

Fred Fish Disk 110

A68k A 68000 assembler written in C. S.

Pdc An optimizing C compiler for the 68000 processor. update to FF53. but not based on that code.

Fred Fish Disk 111

AmyLoad A graphical monitor of cpu, blitter, & memory use. Includes two components; load.device,monitors system parameters, & amyload, which is the user interface & display program. by Jeff Kelley SE

AssignDev Assigns multiple names to a given device. modified version of the original released on disk number 79. By Phillip Lindsay, mod by Olaf Seibert SE

Gauge Continuously displays memory usage in a vertical bar graph Binary only. By:Peter da Silva

HeliosMouse Another "sunmouse"prog. Automatically activates a window by mouse pointer V 1.1, update to FF84. By:Davide Cervone SE

Labels Alphabetic & numeric ordered cross reference lists of defined system constants. Recommended for debugging purposes only, use the symbolic values in progs! By:Olaf Seibert

Mandel Mandelbrot generator program, with bits & pieces of code from C. Heath & R.J. Mical. By:Olaf Seibert S

PopLife A PopCLI type that plays life all over your screen. Lots of bits & pieces from Tomas Rokicki's blitlab & John Toebes' PopCLI. By:Olaf Seibert S

Fred Fish Disk 112

BeachBirds Beach scene portrayed by sprites & sound 512K machine. By:Jerrold Tunnell B only.

Bully Pushes all open screens around (thus the name "bully"). Show more than one demo at a time By:Mike Meyer S

DropShadow Dropshidow V2.0, use with Bryce Nesbitt's Wavebench demo. B only. By:Jim Mackraz

HagenDemos "RGB" & "Focus". RGB requires one meg, B only. By:Joel Hagen

Viacom Latest version of viacom for use in conjuction with WaveBench demo. B only. By:Leo Schwab & Bryce Nesbitt

WaveBench A neat screen hack, & runs on 512K machines. For more laughs, try in conjunction with Viacom or Ds (Dropshadow). Includes S. By:Bryce Nesbitt

Fred Fish Disk 113

AmiCron Simple Unix "cron" type program,a background task uses a disk-resident table to automatically run certain tasks on a regular basis, at specific times. V 2.3, S. By:Steve Sampson, Amiga port by Rick Schaeffer

Dme V 1.28f of Matt's text editor. A simple WYSIWYG editor for programmers. Not a WYSIWYG word processor Features : arbitrary key mapping, fast scrolling, title-line statistics multiple windows, iconify windows,etc. Update to FF93, S. By:Matt Dillon

DosDev Example DOS device driver in Manx C. Version 1.10, includes S. By:Matt Dillon

M2Amiga Demo of M2Amiga. A fast single pass Modula-2 compiler with editor, linker, a small set of interface & standard libraries. Compiles only small demo programs by limiting codesize & imports. Further development of the ETHZ compiler on FF24. B only. Demos with Source. By:R. Degen, C. Nieder, M. Schaub, J. Straube (AMSoft)

NoIconPos Clears position info of any icons, allows WorkBench to pick a new place for the icon. Useful for disk & drawer icons where Snapshot rewrites the icon & the window information. Modula-2, another demo for M2Amiga By:Markus. Schaub

Fred Fish Disk 114

CDecl English to C (and vice versa) translator for C declarations, a must for anyone except possibly the most hardcore C guru. By:Graham Ross, S

Vt100 V2.7 of vt100 terminal emulator with kermit & xmodem file transfer. Includes a few bug fixes posted to Usenet shortly after the posting of v2.7. Update to FF55. Includes S. By:Dave Wecker

WBLander a special version of the WBLander program from FF100. Ending is unique. Effective use of sound, Includes S. By:Peter da Silva & Karl Lehenbauer

Fred Fish Disk 115

Killer Masterful Video commercial of the Amiga, Beatles music, requires one meg of memory to run. Binary only. By:R. Wilt

Marketroid Another devious sprite oriented demo with lots of "in" jokes. 512K required, includes S. By:Leo Schwab

Fred Fish Disk 116

Movies A ram animation system with three different example animations; Kahnankas, Rocker, & F-15. Kahnankas & Rocker run on a 512K Amiga & show off overscan HAM mode. Includes a animation player program (movie), animation builder programs (dilbm, pilbm), & a text/graphics display program (vilbm). By:Eric Graham & Ken Offer

Fred Fish Disk 117

AMUC_Demo A really neat horizontal scrolling demo that is a 2400 x 200 pixel 32 color IFF picture composed of digiview snapshots of members of the AMiga Users of Calgary, superimposed on a very wide picture of the Calgary Skyline. B only. By:Stephen Vermeulen & Stephen Jeans

ExP_Demo Demo version of Express Paint 1.1., used to create the scrolling demo picture in the AMUC_Demo drawer on thi disk. B only. By:Stephen Vermeulen

Fred Fish Disk 118

Empire Complete rewrite, in Draco, of Peter Langston's Empire . A multiplayer game of exploration, economics, war, etc, can last months.Use local keyboard or modem.V1.0, shareware, & S . By:Chris Gray, original game by Peter Langston

HAMmmm Displays lines whose end points are bouncing around the screen, which is a double buffered HAM screen. The Y positions of the points are continuously copied into an audio waveform and played on all four channels, & the pitch of a just intoned chord is derived from the average X position of these points. JForth. Source By:Phil Burk

Stars Based on original code by Leo Schwab, credits longer than actual demo. Runs on 512K Amiga. B only. By:Hobie Orris

WireDemo Demonstrates the Amiga's line drawing speed. Runs on a 512K Amiga. Includes S. By:Matt Dillon

Fred Fish Disk 119

MicroEMACS V3.9e of Daniel Lawrence's variant of Dave Conroy's microemacs. Update to FF93. Also included, for the first time, is extensive documentation in machine readable form. SE. Author: Dave Conroy, Enhanced by Daniel Lawrence

Fred Fish Disk 120

Amoeba Clone of Space Invaders, one of the PDS games for the Amiga. B only BY: LateNight Developments

BackGammon Graphical Backgammon (an undergraduate A.I. course project). Version 1.0, S. By: Robert Pfister

Bankn A complete checkbook system offered by the author as shareware. Version 1.3, binary only. By: Hal Carter

EgyptianRun "road race + hazards" type game. Version 1.1, B only, shareware, source available from author. By: Chris Hames

IconImage Replace an old Icon image with a new image, without affecting icontype, drawer data, etc. SE. By: Denis Green

Fred Fish Disk 121

BasicStrip AmigaBASIC prog. helps to convert programs written in other forms of Basic to AmigaBASIC. By: George Trepal

DataPlot Shareware,AmigaBASIC, plotting program. Also includes a least squares curve fit program. By: Dale Holt

Plot Shareware 3-D AmigaBASIC graphing prog. & sample output plots. Source available via author.By: George Trepal

Stairs AmigaBASIC prog. demos a musical illusion based upon perceptual circularity of widely spaced tones whose volumes are defined as a sinusoidal relationship to their frequency. By: Gary Cuba

Uedit V2.3 of this nice shareware editor. With learn mode, command language, menu customization, and other user configurability and customizability features. Binary only, shareware, update toFF60. By: Rick Stiles

WBColors Prog to change Workbench colors for progs that expect to be booted off their distribution disk but are run from a hard disk. SE. Author: Stefan Lindahl

Fred Fish Disk 122

Asteriods Asteroid game. The images and sounds are replaceable by the end user. Anything goes! By: Rico Mariani

iff2Pcs Ilnteractive puzzle prog. takes any IFF file with up to 16 colors, and breaks it up into squares to make a puzzle which the user can then piece together. V1.0,S. By: Ali Ozer

Names A shareware program to create and manage mailing lists. Binary only. By: Ernie Nelson

Pr Utility to print listings in different formats. Similar to the Unix "pr" program. Includes source By: Samuel Paolucci

PushOver Board strategy game, AmigaBASIC. Push your pieces onto the board until yfive in a row in any direction.S. By: R.Yost

PuzzlePro Create a puzzle from an IFF picture, which the user can then piece back together again. AmigaBASIC. V1.0, B only, shareware, source available from author. By: Syd Bolton

Fred Fish Disk 123

Arp ARP stands for "AmigaDOS Replacement Project". Arp is an effort led by Charlie Heath of Microsmiths Inc., to replace the current DOS in a compatible fashion, so that current programs will continue to work. Arp also makes whatever improvements are possible, so that current and future programs will work better. Various authors contributed work

Car One of Allen's entries to the Badge Killer Demo Contest. It apparently is an inside joke relating to a well known Amigan's experience with a certain highend graphics hardware manufacturer. Author: Allen Hastings

Fred Fish Disk 124

icons Some sample animated icons. By: L. Pfost

Tarot AmigaBASIC Nice graphic of tarot cards. Author: L.Pfost

Fred Fish Disk 125

ElGato Animation entry to the BK D Contest. Background music arrangement, requires Sonix to use. By Kevin Sullivans

Fred Fish Disk 126

Colour Manipulate the colors of specific named screens, saving current color sets to data files, loading new color sets from data files, or interactively changing colors. S. By J. Russell

Dance Two programs, "dancing polygons", are entries to the BKD Contest. They aresimilar, but demonstrate the range of colors available on the Amiga. S. By: John Olsen

HBHill Animation entry to the BDK Contest. First known animation using the "Extra Half Brite" mode. By: Kevin Sullivan

Iconify Subroutine creates an icon on the Amiga screen that can be subsequently dragged around, and double-clicked on. You can use this to have your programs "iconify" themselves to temporarily get out of the user's way. With source & demo program. By Leo Schwab

OnlyAmiga Animation entry to BDK Contest. Three balls being juggled by pyramids rotating on their tops. By Iqbal Singh Hans

Suplib Support library needed to rebuild various programs of Matt's from source, including DME, DTERM, etc. S By Matt Dillon

VCheck V1.2 of virus detection prog. from Commodore Amiga Technical Support.. Will test for the presence of a virus in memory, or on specific disks. B only. By: Bill Koester.

Fred Fish Disk 127

Bounce Entry for BDK Contest. Creates little dots that bounce around and multiply. S By: Steve Hansel and Tom Hansel

Nemesis Entry to BDK Contest. It is quite small for what it does, and won fifth place in the contest. B only. By Mark Riley

Ripples Entries to BDK Contest. Unlike most other animations, it shows a fixed object from a moving point of view, instead of vice versa. By: Allen Hastings

Fred Fish Disk 128

Dis 68000 disassembler, written in assembler. S By Greg Lee

DropCloth Place a pattern, a 2 bitplane IFF image or a combination of a pattern and image, into the WorkBench backdrop. Version 2.2, shareware, B By: Eric Lavitsky

LedClock An extremely simple clock program, for interlaced screens only. S By: Ali Ozer

MRBackUp Hard disk backup utility, does a file by file copy on AmigaDOS floppy disks. With an intuition interface & file compression. V1.3, Source. By: Mark Rinfret

Paint Simple screen painting program, written in web. Requires web preprocessing program to rebuild from source. Includes source in web. Author: Greg Lee

PrtDriver A printer driver for the Toshiba "3 in one" printer in its Qume (best) mode. Includes source in C and assembler. By: Rico Mariani

SDBackUp A hard disk backup utility. CLI interface only. Does file compression. V 1.1, binary only. By Steve Drew

Sed A clone of the Unix sed (Stream EDitor) program. Includes source. By: Eric Raymondw

Keys A "hot-keys" program binds keyboard function keys to window manipulation functions (window activation, front to back, moving screens, etc). S By: Davide Cervone

Fred Fish Disk 129

DosKwik A pair of programs which allow you to save files, or a group of files, to one or more floppies for quick loading, does not store files in DOS format, for speed. V2.0, update to FF103. B, Shareware. By: Gary Kemper

MRBackUp A hard disk backup utility, does a file by file copy to standard AmigaDOS floppy disks. Includes intuition interface & file compression. V2.0 (with sources) and 2.1 (binary only, source available from author). Update of FF128. By Mark Rinfret

PaintJet HP PaintJet printer driver from HP sources.

Patch Two independent ports of Unix utility "patch", which applies context diffs to text file to automatically update them. Patch V 1.3 was ported to the Amiga by Rick Coupland and patchV2.0 was ported by Johan Widen. S By: Larry Wall

Fred Fish Disk 130

DirMaster Shareware disk cataloger, V1.1, update of FF108, new features and enhancements. B only. By Greg Peters

Evo Human evolution toy/tutorial with source.By S. Bonner

Hp RPN calculator prog, supports calculations with binary, octal, decimal, hex, float, and complex numbers. Includes 32 registers for storing data & transcendental functions. V1.0, S By: Steve Bonner

Mach "mouse accelerator" prog. with hotkeys, features of sun mouse, clicktofront, and popcli, a title bar clock with a bbs online charge accumulator, etc.V1.6a, S By: Brian Moats

PatEdit A pattern editor for creating patterns to input to the Amiga SetAPPt macro call. Call sets the area fill pattern for the area filling graphics (RectFill, AreaDraw, etc). Includes source. By Don Hyde

QMan Mandelbrot generator written partially in assem. for speed. Includes source. By Steve Bonner

Fred Fish Disk 131

Dfc Copies disks like Maurader, but multitasks. Replaces diskcopy and format (smaller than either). Intuition interface. S By: Tomas Rokicki

HyperBase Shareware database management system. V1.6, Binary only, source available from authors. FF58 update. By: Michael MacKenzie, Marc Mengel, & Craig Norborg

Life A new version of Tomas's ancient Life game, with a new macro language for setting up patterns, good examples, S By: Tomas Rokicki

Mackie A Popcli replacement that draws pretty lines on the screen in blanking mode. Includes source. Author: Software Distillery; enhancements by Tomas Rokicki

Mg1b A version of Mg1b with an ARexx port and other improvements by Tomas Rokicki. Define macros & bind them to function keys in startup file. Includes source. Author: Various; enhancements by Rokicki

WFrags Another version of Frags, Pops up a little window that updates occasionally. Good for developers to monitor what progs. are doing to memory. S By: Tomas Rokicki

Fred Fish Disk 132

Berserk Animation, a "must see" for every Amiga user, and ranks with "Juggler" as a premier demo for the Amiga. The difference between this distribution, and FF100, this one includes "source". use it as an example for creating animations. Fred Fish felt it was appropriate to have at least one animation that was available at the "source code" level. Author: Leo Schwab

Fred Fish Disk 133

Conman Shareware replacement for the standard console handler, provides line editing and command line histories completely transparent to any application program that uses CON: windows. V1.1, binary only, updateoFF100. New features include additional editing keys, fast search keys, undo key, clear history command, and more. Author: William Hawes

Crc Two programs useful for generating 16-bit CRC listings of the contents of disks, and verifying that a given disk's files still compute to the same CRC's as listed. V1.0, binary only. By: Don Kindred

CrcLists Complete CRC check files for FF1-128 using the Crc program included on this disk. These were made directly from Fred's master disks. Author: Fred Fish

Overscan Patches the Intuition library so that sizable windows with MaxHeight of 200 (400 in interlace) and screens with Height of 200 (400 in interlace) will take advantage of the PAL overscan capability of Intuition V1.2. Useful only for European users who wish to run software written for the US market, without modifying the applications, but still using the additional space. S By Ari Freund

Fred Fish Disk 134

BoingThrows 50 frame HAM animation done with Sculpt-3D, and DigiPaint. The animation took about 325 hours of runtime to generate. By Marvin Landis

Browser Workbench tool, using text-only windows, makes all files in the system accessible for executing, copying, moving, renaming, deleting, etc. Billed as a "programmers workbench". V1.2, binary only. BY Peter da Silva

Dme V1.29 of Matt's text editor. Simple WYSIWYG editor designed for programmers. Arbitrary key mapping, fast scrolling, title-line statistics multiple windows, & ability to iconify windows. FF113 update,S. By Matt Dillon

For PDS orders, please use form on page 112

Find Utility searches for files that satisfy a given boolean expression of attributes, starting from a root pathname and searching recursively down through the hierarchy of the file system. Like the Unix find program. V1.0, includes source. By Rodney Lewis

Library Demo version of a shareware program that stores textual information without regard to structure or content, and allows complicated searching for specific patterns. , B only. By: Bill Brownson

SmartIcon Shareware Intuition objects iconifier. V1.0 is limited to iconifying windows, adds a new "iconify gadget" to each window, when clicked, iconifies the window into an icon in the ram: disk. B only, source available from author. By: Gauthier Groult

Fred Fish Disk 135

TeXF A selection of 78 TeX fonts, with a conversion program to convert them to Amiga fonts. 22 different fonts at various sizes, ranging from 15 pixels high to more than 150 pixels. Conversion program can also be used with the fonts distributed with AmigaTeX, yielding an additional 1000+ fonts for use withother Amiga programs. V2.5, binary only. By: Ali Ozer

Fred Fish Disk 136

AsmToolBox Assembler "toolbox" created to make interfacing between assembler programs and AmigaDOS easy. With source. By Warren Ring

Bison A replacement for unix "yacc" command. From the GNU (GNU is Not Unix) effort. Port of the latest GNU version, by William Loftus, with the goal of preserving all of bison's current features. Includes source & test pro. "calc". By: Bob Corbett and Richá Stallman.

Iff2Pcs Interactive puzzle progr. takes any IFF file containing up to 16 colors, and breaks it into squares to make a puzzle the user can then piece back together again. V1.1, update of FF122, includes source. By Ali Ozer

Paste Version of the Unix paste utility. Paste concaterates corresponding lines of the specified files into a single output line (horizontal or parallel merging) or concatenates them into alternate lines (vertical or serial merging). S. By: David Ihnat

YaBoingII Game prog. demonstrating hardware sprite usage, including collision detection. Update of FF36. S. By: Ali Ozer, based on original by Leo Schwab

Zoo File archiver, like "arc" in concept, but different in implementation and user interface details. Includes features that "arc" lacks (such as file/path names up to 255 characters in length). V 1.71, update of FF108. B. By: Rahul Dhesi, port by Brian Waters

Fred Fish Disk 137

Ct Program to display images from a CT scanner, along with several interesting sample images of scans of real people, including a skull, brain, heart, and spine. Each image is 256 by 256 pixels in 2048 gray scale. The display software, a primitive user interface, is quite powerful, including functions like convolutions, averaging, laplacians, unsharp masking, edge detection, gradients, etc. Binary. by: J. Harman

JeansIcons Miscellaneous cute icons created for AMUC's monthly newsletter disk. Submitted by Stephen Vermeulen. Author: Steve Jeans

Muncho A cute little program which plays a digitized sound sample when you insert or remove a disk from your drive. If you don't like the sounds, you can replace them with your own. Binary only. By: Andrew Werth

Sit Update to the Set Icon Type prog. on FF107. V1.10, includes source. Author: Stephen Vermeulen

VGad A new gadget editor that takes two pictures of the window and its gadgets, one being the normal gadget state and the other being the fully selected state, then merges the data and converts to C source code. V1.0, binary only. Author: Stephen Vermeulen

VirusX A boot sector virus check program that runs in the background and automatically checks all inserted disks for a nonstandard boot sector. Such disks can optionally have their boot sector rewritten to remove the virus. Includes source. Author: Steve Tibbett

VLabel Program to print fancy customized disk labels. Combines an IFF picture and up to 50 lines of text (which may be placed arbitrarily in any font or point size) then print the result. The IFF picture can be virtually any size (up to 1008 by 1000). It will also print labels from a batch file produced by SuperBase. V1.20, binary only. By: Stephen Vermeulen

Fred Fish Disk 138

AmigaLine A series of various technical notes for Amiga programmers. By: Byrce Nesbitt

Diff Uses the same algorithm as the Unix diff program and also produces context diffs, suitable for use with patch. Binary only. By: Unknown (Decus C diff?)

Foreach A simple but useful program that expands a wild card file specification and then invokes the specified command once per expanded filename, with the expanded filename as the command argument. Includes source. Author: Jonas Flygare

MacFont A conversion tool to convert Mac fonts to Amiga fonts. Binary only. By: John O'Neill and Rico Mariani

ModulaTools Various useful routines for those using in Modula on the Amiga. Update to FF94, S . By: Jerry Mack

Vt100 Two new versions of Dave's vt100 terminal emulator. One version, based on vt100 2.6, has been enhanced by John Barshinger to include an iconify feature, add full 132 column support using overscan, and other features (binary only). The second version is release 2.8 of the main-stream version of vt100, as enhanced and supported by Tony Sumrall. S. By: Dave Wecker

Fred Fish Disk 139

AmiCron An enhanced and debugged version of AmiCron 2.3 from FF113. Includes source. By: Steve Sampson, Rich Schaeffer, Christian Balzer

ListScanner A nice little utility to display all the Exec lists. Simular to Xplor utility FF73. Includes source in assembler. By: Heiko Rath

ProCalc Simulates HP-11C programmable calculator. Both English & German versions. Shareware, B only. By: Gotz Muller

RemLib Removes a specified library (if currently unused) or displays some info on all available libraries. Source in assembler. By: Heiko Rath

TurboBackup A fast mass floppy disk duplicator with enforced verify mode to prevent errors. V1.0, binary only. By: Steffen Stempel and Martin Kopp

WArranger Sends a window, identified by its name, to the front or back, without selecting it. Useful with AmiCron. Works on all screens. Includes source in assembler. By: Heiko Rath

WheelChairSim A wheelchair simulator developed as a project for the Technical Resource Centre and the Albert Children's Hospital, to allow the matching of a wheelchair joystick to a child's handicap and allow the child to practice using the chair in a safe (simulated) environment. Binary only. Author: Unknown, submitted by Dr. Mike Smith

Fred Fish Disk 140

SBProlog Volume 1 of the 2 volume Stony Brook Prolog (SBP) distribution, V2.3.2. This volume contains the executables and libraries. Volume 2, on FF141, contains the C and Prolog Source. By: Logic Programming Group at SUNY, Stony Brook Amiga port by David Roch & Scott Evernden

Fred Fish Disk 141

SBProlog Volume 2 of the 2 volume Stony Brook Prolog (SBP) distribution, version 2.3.2. Volume 2 contains the C and Prolog source code. Volume 1, on FF140. By: Logic Programming Group at SUNY, Stony Brook Amiga port by David Roch and Scott Evernden

SmallC An Amiga port of the Small-C compiler, written by Ron Cain and published in Dr. Dobb's Journal, in about 1980. Small-C is a rather small subset of the full 'C' language. It is capable of compiling itself, and other small, useful programs. Requires an assembler and linker to complete the package and produce working executables. Source and binary. By: Ron Cain. Amiga port by Willi Kusche.

Fred Fish Disk 142

Diff Program uses same algorithm as Unix diff prog. and produces context diffs, suitable for use with patch.Same as FF138, but now includes the missing files (including source code). Author: Unknown (Decus C diff)

FracGen Generates fractal pictures from "seeds" you create. Unlike any of the other "fractal generators", it can be used to load and display previously created fractal pics, modify existing fractals, or create your own fractals. V1.1, B. By:D.Houck

SciSubr Scientific Subroutine Package from DECUS, ported to the Amiga to run with Absoft Fortran. A valuable resource of mathematical and statistical source code for those doing Fortran work on the Amiga. Author: Unknown; ported to the Amiga by Glenn Everhart

Fred Fish Disk 143

Rim RIM-5 (Relational Information Manager), a full relational DBMS suitable for VERY large databases using B-Tree data storage, crude (by today's standards) user interface, but full source code is provided. RIM runs on a wide variety of systems, small and large, and produce compatible databases. Includes a built in HELP database and a programming language. Full Fortran source & documentation included. by: Various, Amiga port by Glenn Everhart

Fred Fish Disk 144

AnalytiCalc V22-3D of Glenn Everhart's large and powerful spreadsheet program, update to FF104. Extra features "to have some pretentions of acting as an 'integrated system'. A virtual memory system supporting up to18000 columns and 18000 rows, multiple equations per cell, an outlining system, built-in cell annotation, and datafile access from any cell(s) of the sheet, plus an array of functions not present in most commercial spreadsheets. Source and documentation in arc'd form.

Fred Fish Disk 145

Csh Modification of csh like shell to provide file name completion and argument execution. Requires ARP 1.1. Binary only, but includes diffs for the reference 2.07 source base. Author: Matt Dillon; enhancements by Johan Widen

DMouse Versatile screen blanker, mouse blanker, auto window activator, mouse accelerator, popcli style programmable command key, pop window to front, push window to back, etc, widget. Very useful program! . V1.06, includes source. Author: Matt Dillon

Net Link protoco provides essentially an unlimited number of reliable connections between processes on two machines, where each can be either an Amiga or a Unix (BSD4.3) machine. Works on the Amiga with any EXEC device that looks like the serial.device. Works on UNIX with tty and socket devices. Achieves better than 95% average throughput on file transfers. V1.20, includes sources for both the Amiga and Unix versions. Author: Matt Dillon

Tab Tablature writing program, with intruments for a banjo and string guitar. Binary only. Author: Jeff deRienzo

TinyProlog VT-PROLOG is a simple prolog interpreter provided with full source code to encourage experimentation with the PROLOG language and implementations. Version 1.1, includes source. Author: Bill and Bev Thompson

Fred Fish Disk 146

Blanker2 A screen blanking program that turns the screen black after 90 seconds of keyboard and mouse inactivity. V1.27.88, includes source. Author: Joe Hitchens

C-Light A demo copy of a commercial ray tracing program, identical to commercial version but limited to ten objects per scene. Binary only. Author: Ronald Peterson

CrcLists Complete CRC check files for FF129-141 and FF143-145 of the library, using the crc program from FF133. Made directly from Fred's master library. FF142 omitted due to a problem with the crc program. by: Fred Fish

DmeMacros A set of DME macros which utilize templates to turn DME into a language-sensitive editor for C, Pascal, Modula-2, and Fortran. By Jerry Mack

MemoPad A shareware intuition-based memo reminder program. Nicely done. V1.1, binary only. by: Michael Griebling

Fred Fish Disk 147

MicroGNUEmacs MicroGNUEmacs(MG 2b) contains many additions and enhancements since the original works by Dave Conroy (credit belongs to all contributors and Beta testers. Note: Amiga specific source code files and the document files have been archived. An executable copy of the PDS archive program "Zoo" is in the "c" directory

Fred Fish Disk 148

EFJ "Escape from Jovi" A machine-code game featuring hi-res scrolling, large playfield, disk-based Hi-Score list, stereo sound, and multiple levels. Use a joystick in port 2 to control the ship. B, shareware ($8). By: Oliver Wagner

Fme Nicely done map editor for the Fire-Power (tm) game. Features interlaced hi-res with intuition interface. See the "Readme.fml" file for information on making a bootable disk. Includes source. Author: Gregory MacKay

HandyIcons Adds a menustrip to the WorkBench window that allows you to run selected Workbench Tools by menu selection. Can be set up to provide custom environments. Current version supports only WorkBench Tools and not Projects. Binary by: Alan Rubright

Scrambler A simple program that will encode/decode a text file into illegible gibberish, which resembles executable code, to evade prying eyes. Version 0.01, Binary only. Author: Foster Hall

Fred Fish Disk 149

AnimalSounds A sample of digitized animal sounds along with a simple sound player. Authors: The Trumor Company, Inc. Sound Player by Don Pitts

DX-VoiceSorter Written to be used with Jack Deckard's VoiceFiler program. (Disk 82). It allows for the sorting of a number of voicefiles stored using that program into a new voicefile of voices made up from various files. Includes source. Author: David Bouckley

Keep A nice little utility program with an intuition interface for BBS and network junkies who download messages in one large file and then read them off-line. Using only the mouse, you can drive through such files a message at a time, examine each at your leisure and tag those you wish to keep. Version 1.2, binary only, but source available with donation to author. Author: Tim Grantham

Less Like Unix "more", only better, with forward and backward scrolling, searching and positioning by percent of file and line number, etc. Now lets you also print the current file. Very useful! This is Amiga version 1.3, an update to the version on disk number 92. Includes source. Author: Mark Nudelman, Amiga port by Bob Leivian

Scheme "Scheme is a statically scoped and properly tail-recursive dialect of the Lisp programming language invented by Guy Lewis Steele Jr. and Gerald Jay Sussman." Binary only. Amiga port by Ed Puckett

Fred Fish Disk 150

AirFoil An update to the Airfoil generator on disk #71. Generates airfoil models as well as their corresponding streamline and pressure distributions. Includes source. Authors: Russell Leighton Addendum by David Foster

DC10 An AmigaBasic DC-10 instrument flight simulator. Appears to be quite in-depth with flight-planning and take-off options along with an extensive documentation file. Requires rebuilding on a separate disk and was successfully done so by following the author's instructions in the ReadMe_First file. Author: Jan Arkesteijn

ExecLib A working example of how to build and use user-defined disk-resident libraries. Of special interest to developers working with Lattice C. Author: Alex Livshits

Iconizer A utility program that saves your current mouse pointer to a small icon. You can restore the pointer just by double-clicking on its icon. Allows for building a whole library of pointers and to use them whenever you want. Binary only. Author: Alex Livshits

Pilot An implementation of the PILOT language for the Amiga, including a demo done for the National Park Service. PILOT is a limited use language for use in educational and computer based instruction programs. Binary only with Beta test kit available from authors. By: T. LaGrone

StealMemBoot A small utility designed to be a direct replacement for NoFastMem kind of programs. It modifies the boot block of a disk, so when you boot with it, all memory allocations will return only CHIP memory. Author: Alex Livshits

Fred Fish Disk 151

GlobeDemo Graphics demo displays very smooth transitions of the rotating earth. Pop-up menu. Source. by: Bob Corwin

Icons Yet another potpourri of interesting icons to choose from if you need one for your own program. by: Dave Tumock

Pcopy A small intuition-based disk copier similiar to the resident "DiskCopy" except with write-verify and other user-selectable options. Useful for making multiple copies with reliable data. Requires two disk drives. S. by: Dirk Reisig

SCT A CLI-based utility (SetColorTable) for displaying and/or setting a screen's colors. Save the colors of a screen to be restored later, or copy one screen's colors to another. Includes source. Author: aklevin

SlideShow Very nicely done slide-show program written in assembly language. Features forward/backward presentation and creative screen wipes. Currently works only with IFF lo-res pictures. Executable only along with some new IFF pictures to have come my way. Shareware ($16). Authors: Mike McKittrick and Sheldon Templeton

Surveyor A little utility that opens a window on the current screen and displays information about the pointer. Allows for absolute or relative measurement between two points on the screen. Very handy for precise positioning of icons and such. Includes source. Author: Dirk Reisig

Fred Fish Disk 152

Blk A requester making tool employing various recursive algorithms including a recursive parser. It takes input text files and converts them to C-source for including as requester declarations. Includes source. Author: Stuart Ferguson

RunBack A variant of Rob Peck's RunBackGround program from disk number 73. Allows you to start a new CLI program and run it in the background, then closes the new CLI. This version automatically searches the command-search-path to find the program. Source. By Daniel Barrett

UUCP This is a version of uucp (Unix to Unix Copy Program) for the Amiga, along with some miscellaneous support utilities like cron, mail, and compress. Includes source. Author: Various, submitted by William Loftus

Fred Fish Disk 153

Dme Version 1.30 of Matt's text editor. Dme is a simple WYSIWYG editor designed for programmers. It is not a WYSIWYG word processor in the traditional sense. Features include arbitrary key mapping, fast scrolling, title-line statistics multiple windows, and ability to iconify windows. Update to version on disk number 134, includes source. by: Matt Dillon

HP11 Emulates an HP11C calculator including the program mode. Features an ON/OFF button that turns the calculator into an icon that will sit and wait until you need it again. Documentation on the features is scarce, perhaps some industrious HP owner could write a small tutorial for the benefit of those that don't own an HP calculator. Binary only. Author: David Gay

HPMam A program to manipulate settings and fonts on HP LaserJet+ printers and compatibles. Includes an intuition interface and some sample picture files. Version 1.0, binary only, shareware. by: Steve Robb

Synthemania An interesting, very small (and very persistent!) musical piece. If you plan on stopping it without using three fingers, you better read the document file first! Binary only. by: Holger Lubitz

Fred Fish Disk 154

Ada An Ada Syntax checker for the amiga. Includes lex and yacc source. Author: Herman Fischer; updates by William Loftus

AssemblyDemos A interesting group of assembly language demos for your visual and aural pleasure. Binary only. by: Foster Hall

DiskLib Two utilities for those people who like to split up PD disks into disks of different categories. Includes source. by: Wilson Snyder

Guardian Another virus diagnosing and vaccination program. Recognizes any non-standard bootblock. Includes a small utility program to permanently place the program on a copy of your kickstart disk in place of the seldom (if ever!) used Debug() function. Binary only. by: Leonardo Fei

PrintSpool A print-spooling program. Very useful for printing files in the background. Many command-line options. Version 1.0.0, Includes source. Author: Frangois Gagnon

Utilities A group of four little utility programs:

- UnDelete - Undelete a file from floppy (DF0:) to any device you request, checks for a disk in the drive and allows you to abort cleanly with a CTRL 'C'.
- Whereis - Looks for a file and or directory defaults to the current device
- CAL - Clone of the Unix CAL , dates fromyear 1 to 9999.
- DClock Simple title bar clock/memory gauge with pop to front.

VirusX An update to the virus-detecting program of the same name on disk number 137. This version also checks for the Byte-Bandit strain. Version 1.21, Includes source. by: Steve Tibbett

Virus_Alert! Yet another anti-virus program with a twist. Once installed a message is displayed just after a warm or cold boot notifying the the user that the disk and memory are virus-free, and forcing a mouse-button press before continuing. Anything writing to the bootblock thereafter will destroy the message and a normal virus- infected boot (???) will take-place. Versions 1.01 and 2.01, Binary only. by: Foster Hall

Wicon A "Window Iconifier". Allows you to turn your windows into small icons which can be later recalled. Currently installed with MacWin to give your windows a "rubber-banding" effect. Version 1.14, Includes source. by: Steven Sweeting Introducing the Amiga

Fred Fish Disk 155

AsmExamples A couple of assembly code examples. Executables are not extremely useful but the code might be of considerable benefit to beginning assembly languageprogrammers. by: Henrik Clausen

Bison A replacement for unix "yacc" command. From the GNU (GNU is Not Unix) effort. Contains updates to the version on disk number 136, submitted by two separate sources. Includes source. by: Bob Corbett and Richard Stallman, updates by William Loftus & Scott Henry

NoSmoking Sample program showing the use of a recoverable alert while displaying a personal health message. Includes source. Author: Theo Kermanidis

Scenery A very nice assembly language random scenery generator. Generates very realistic looking landscapes. Includes intuition interface and lots of menu options. V. 1.0, binary only by; Brett Casebolt

Fred Fish Disk 156

Blocks2 Amusing and colorful display of a moving trail of"blocks". Update to version on disk number 71, however this version also Source. by: Gary Walker

Flex Flex is a replacement for the UNIX "lex" (lexical analyzer generator) program that is faster than lex, and freelyredistributable. Includes source. Authors: Jef Poskanzer, Vern Paxson, et. al. Submissions by William Loftus and Scott Henry

Go64 Another screen hack aimed at an earlier Commodore product (Not to be confused with the commercial product Go-64! fromSoftware Insight Systems). Includes source. by: Joerg Anslik

Grammars A group of lexical grammar files for Ada, C and Pascal for use in conjunction with the flex program on this disk and thebison program on disk #155 by: Various, submitted byWilliam Loftus

OOPS! Tired of the monochrome background color of your Workbench or CLI? Then try this colorful screen hack to brighten things up!Includes source. by Joerg Anslik

Fred Fish Disk 157

60or80 A small utility to toggle the 60/80 column text modes without having to go through preferences. Works from either the CLI or the Workbench. S by: Mark Schretlen

AmicForm Creates a phonebook containing only those areacodes and exchanges reachable through PC-Pursuit. Input any of Chet Solace's Finalist BBS lists and it creates the phonebook in a form usable byAmicTerm other popular terminal programs.V. 1.3, Binary only. by: J. Motsinger

AnimBalls A nifty little animation program that allows you to create a collection of balls in three-space and then interactively rotate them in real time using the mouse. Includes source.by: Jim Guilford

BootBack A handy little utility to copy and save the boot block from a disk, then later restore it should the disk get stomped on by some ugly virus. Source. by: David Joiner

ECPM A CP/M emulator for the Amiga.Emulates an 8080 along with H19 terminal emulation. Update from version on disk number 109.Source.by: Jim Cathey; port by Charlie Gibbs; Significant improvements by Willi Kusche

KeyFiler BBS message file sorter that allows sorting by keyword. Includes a textreader, Soundex matching, and limited wildcardcapabilities. V. 1.0, Binary only.by: J. Motsinger

ScreenZap A little utility to clean away screens that are left by illbehaving programs. It will kill every screen behind the WorkBench, noting how many it gets. The screens in front of WB are not affected. Source. by: Lars Clausen

SetPrefs Allows you to build a whole library of preference settings and instantly switch back and forth between them. Affects allpreference settings not just the colors. Very useful for machines with multiple users or multiple external devices. Includes Amiga's default and various sample preference settings. B only. by: Martin Hippele

Xicon Xicon lets you use icons to call up scripts containing CLI commands. This is version 2.01, an update to FF102. Includes source. by: Pete Goodeve

Fred Fish Disk 158

DiskX Nicely done Sector-based disk editor. Binary only by: Steve Tibbett

MemBoardTest Originally designed for production testing of A1000 memory boards. Very nice intuition interface. Version 2.4, Source in Modula by: George Vokalek

MSDOS A program to list files written in standard MS-Dos orAtari ST format. The files can then be copied to Ram and rewritten to disk in Amiga-Dos format. Binary only, Shareware, V. 0.1.Author: Frank Wibbeling

PCBTool Early version of a shareware PC Board layout program Lots of options including variable size pads and traces, grids, grid snap, layers, zoom, selectable centering, text and more. This version does not support printer/ plotter dumps or libraries. V.2.6, B only .by: George Vokalek

ScreenX A handy little background utility that provides a small clock/memory counter in its inactive mode and a versatile screen manipulator when called upon. Binary, source available from author, V2.1.by: Steve Tibbett

TaskX A "real-time" task editor. Lets you list and set priorities of all currently running tasks. Binary , V. 2.0. by: S. Tibbett

VirusX Update to FF154, checks for a couple of additional new strains. Includes source V. 1.6.by: Steve Tibbett

YachtC3 Update to FF10, contains some fixes and incorporates a simple sound process. V3, includes source. Author: Sheldon Leemon, with enhancements by MarkSchreiten

Fred Fish Disk 159

Free A little command to put in your c directory that returns memory status and number of tasks currently served by EXEC Includes source. by: Joerg Anslik

MidiTools A group of several different utility programs for those who run a Midi system. Binary only. by: Jack Deckard

StarChart Nicely done intuition based program to display and identify about 600 stars, galaxies and nebulae visible in the Northern hemisphere. V.1.2, Source. by: Ray R. Larson

TaskControl Nicely done task-handling program allowing you to put to sleep, kill or change priorities of the all the currently loaded tasks.Also potentially GURU-producing, so be careful what tasks you kill, change priorities of, etc. Handy windowizer will reduce it almostto an icon Binary only.by: J. Martin Hippele

TUC "The Ultimate Clock". Another window title clockmemory minder. This one is in 132 columns! Also gives the free memory on drives DF0, DF1 & DF2.Includes source. by:Joerg Anslik

Fred Fish Disk 160

Calls A little utility to help analyze the flow of a C-program by laying out the functions called in a hierarchical manner.Originally from Usenet with major revisions by Kevin Braunsdorf, Amiga portby George MacDonald

Check A useful little utility for finding structural errors in C-source code. Many command-line options. V.1.03, binary only.by: Keith Elbertson

Dis A 68000 disassembler, written in assembly, this is an update to the version on disk #128. Includes source by: Greg Lee with enhancements by Willi Kusche

DMouse A versatile screen & mouse blanker, auto window activator, mouse accelerator, popcli, pop window to front, push window to back, etc, widget. V. 1.09, includes source Update to FF 145 by: Matt Dillon

DWP "Daisy Wheel IFF Printer". A graphics printing utility that allows the printing of IFF pictures on a daisy wheel printer. Includes source. by: Ken Van Camp

M4 A UNIX M4 look-alike macro processor intended as a front end Ratfor, Pascal, and other languages that do not have a built-in macro processing capability. Pd M4 reads standard input, the processed text is written on the standard output. by: Ozan S. Yigit (oz)

MemoPad A shareware intuition-based memo reminder program.Nicely done. Update to version on disk #146, v .2, binary only.by: Michael Griebling

NeuralNets A neural network example using the general-ized back-propagation delta rule for learning, specifically applied to the tabularasa Little Red Riding Hood instance. by: J. C. Hoskins

Fred Fish Disk 161

Friends Sscreen hack with command-line options to keep your mouse pointer company when you step away. Source by: Michael Warner

Getsprite Simple little program to convert Dpaint brushes into C-sourceBinary only. by: Michael Warner

IncRev A handy little program that will automatically increment the revision number of a program every time it is recompiled.Binary only. by: Bryan Ford

LGZ A Map generator/editor for the LGZ game. Not useful if you don't happen to play that game, but good source example of intuition interfacing. V.0.1 by: Lars & Henrik Clausen

Mackie A versatile cli/macro-key initiator based on POPCLI with a unique method of "screen-blanking". I won't say more, just try it!V.1.1, with source. by: Thomas Rokicki

Nag A shareware appointment calendar with it's own editor and a unique 'nagging' feature utilizing the Amiga's voice and audio devices. V.1.6, binary only. by: Richard Lee Stockton

Perl Practical Extraction and Report Language, an interpreted language optimized for scanning arbitrary text files, extracting information from those text files, & printing reports based on the information.by: Larry Wall

VRTest Another anti-virus utility that allows visual inspection of ram starting a $7E7FE, ram cleaning, bootblock inspection and vector monitoring/ reseting. Written in assembly V. 3.2, binary only.by: Babar Khan

XBoot Very simple utility to convert a boot block into an executable file to use your favorite debugger (Wack, Dis, etc.) to study it. withsource.by: Francois Rouaix

Fred Fish Disk 162

Avi A workalike version of the UNIX vi editor for the amiga.Thoug not especially recommended for beginners, designed for those of you who may have the vi commands permanently hard-coded into your fingertips! V.1.0, binary only. by: Peter Nestor

CLI_Utilities This directory contains several subdirectories with small utilities, collected from various sources, only usable from the CLI. Some with source. Author: Various

Dark A small graphics and animation demo.withsource. by: Phil Robertson

Flow2Troff A little utility to convert from New Horizons Software "FLOW" files to UNIX "troff" files, suitable for printing on any troff-compatible laser printer. V. 1.0, includes source and a sample "FLOW" file. by: Daniel Barrett

Labyrinthll A shareware role-playing text adventure game similar in operation to the Infocom text adventures.Includes source. by: Russell Wallace

Iffar Maintains archives of Interchange File Format (IFF) FORM CAT and LIST files in a manner that complies with the IFF CAT specification. V.1.2, includes source by: Karl Lehenbauer

SetPALorNTSC A couple of utility programs for testing the suitability of a developed program in either the PAL or NTSC environments. Includes source and a sample program.by: Peter Kittel

TES "The Electronic Slave" adds a gadget strip to the top of he cli window to perform such functions as device directories info, run ED, and time. Currently, assign-ments are hardcoded but not difficult to change if you own a compiler. V. 1.1, with source.by: Joerg Anslik

UnknownGirl Amall musical piece similar in execution to Synthemania" on FF153. Binary only. byHolger Lubitz

Fred Fish Disk 163.

Bankn A complete shareware checkbook system. Update to FF120. V1.5, binary . by: Hal Carter

FiveInLine Board-playing game similiar to Go-Moku, Ristinolla, etc. Fast-paced & addictive! Source. by: Njel Fiskeljxn

MachII A "mouse accelerator" program which includes hotkeys, the features of sun mouse, clicktotront, popcli, title bar clock with a bios online charge accumulator, and more. Update to FF130. V2.4c, binary only. by: Brian Moats

MemTrace Routines help debug memory allocation and freeing during program development. Complains if you try to free memory you didn't allocate & reports on memory not freed when your prog finishes. by: Jojo Wesener

PcPatch Patches for PCCopy and PCFormat from the 'EXTRAS 1.2' disk, to allow reading/writing/formatting 3.5 inch 360k (2 sides/ 40 Tracks/9 sectors) MS-DOS disks. by: Werner Guenther

ReadmeMaster A nifty little database for finding those programs that you know exist somewhere (???) in the AmigaLibDisk library. Maintains a key-word dictionary of the Contents descriptions that allows searching by disk number, program title, author's name, or some other descriptive word. Currently supports disks 1-154 with planned updates. Binary by: Harold Morash

View A mouse-oriented text file reader. Sample operation is demonstrated in reading the View.doc file, instead of using the usual "Less" text file reader. by: Bryan Ford

Fred Fish Disk 164.

C-Functions A group of four little C-functions to add to your library to make your programming life a little easier. Includes source and a small demo program showing some of the results. by: Lars Thuring

DiskSalv Very useful program to recover files from a trashed AmigaDOS disk. Can also "undelete" files deleted by mistake, so long as they have not overwritten by further disk activity. Requires two disk drives. Many enhancements since the original version on disk #20. Version 1.3, Binary only by: Dave Haynie

Hed A handy little editor that is more user-friendly than "Ed", yet doesn't require the memorization of complicated keystrokes of some of the larger, more powerful, editors. Binary only. by: Hal Carter

Newton Uses the "Newtons Method" algorithm to estimate both real and imaginary roots of a polynomial of degree 20 or less. Version 1.0, includes source. by: Daniel Barrett

NewZAP A third-generation multi-purpose file sector editing utility, from the author of FileZAP. Displays and edits full 512-byte sectors via a 106 character wide internal font. Includes a search feature to find specific strings or hex digits, forwards or backwards. Update to FF#58. Version 3.18, Binary only. by: John Hodgson

PcView Provides the PC community with the opportunity to display IFF pictures to the best of EGA's ability. Displays Amiga pics, IBM-PC Deluxe Paint Pics, Apple II-GS Deluxe Paint Pics, and others in the IFF standard format. Includes source. Author: John Hodgson

PolyRoot Another Polynomial root-finder using the Newtonian algorithm. Nicely done in AmigaBasic with good documentation file. Version 2.00. Author: Jon Giorgini

PrtDrivers A couple of new Printer Drivers. Digital Equipment's LN03+ laser printer, Mannesmann Tally's MT420d dot matrix. Authors: DEC LN03 — Bernie Mentink MT420d — Sascha Wildner

Zoo A file archiver, much like "arc" in concept, but different in implementation and user interface details. Includes some nice features that "arc" lacks (such as file/path names up to 255 characters in length). This is version 2.00, an update to FF 136. Binary only. by: Rahul Dhesi, Amiga port by Brian Waters

Fred Fish Disk 165.

Conman Extremely useful replacement for the standard console handler, provides line editing and command line histories. Completely transparent to any application program that uses CON: windows. Shareware, and well worth a donation to the author. V1.3, binary only, update to FF133. by: William Hawes

CPM Another CP/M emulator independently authored from the version that appeared on disk #157. Emulates a CPM computer with a Z80 processor connected to an ADM3A terminal. Assembly source included. by: Ulf Nordquist

Parsnag A program to aid in performing color separations on Epson JX-80 printers. Source. by: John Hodgson

PlotView A couple of programs, Plotview and Plot2Am, for viewing UNIX plot files. Also included are two sub-directories: Plot — a device independent plotting package for the Amiga, compatible with the UNIX plot subroutine package and Plot2Tek — converts UNIX plot format files to Tektronix 410x terminal graphic commands. Source included. Author: Joel Swank

RamCopy A copy program designed for machines with 1 meg or more of Ram and only one disk drive. Copy a complete disk in only one pass. by: Stephen Gunn

SPUDclock A simple program that uses the narrator device to speak the time at certain user specified intervals. Lots of command line options. Version 1.2, includes source. Authors: Robert E. Beaty and H. Bret Young

Fred Fish Disk 166.

AutoGraf Collects and graphically displays information on auto mileage. Features such as miles per gallon, cost per mile, miles driven, highs, lows, averages, etc. Includes sample data file, a couple utility programs and source. Version 1.0 Author: Joel Swank

Cref C cross referencer program. Prints out your code with line-numbers and complete key-word cross-referencing. Update fro ff#103 which had a serious bug. Includes source. by: Mike Edmonds; Amiga port by Joel Swank

MultiCalc Yet another RPN type graphic calculator. This one generates answers with extreme precision (if 3000 digits is enough!) Features a 48-digit scrollable display, mouse driven with lots of keyboard shortcuts, & iconification during non-use. Binary . by Ken Johnson

Stevie A public domain clone of the UNIX 'vi' editor. Supports window-sizing, arrow keys, and the help key. Version 3.10a, includes source. Amiga port by Tony Andrews

Fred Fish Disk 167.

CDecl English to C (and vice versa) translator for C declarations. This little gem will translate english such as "declare foo as pointer to function returning pointer to array 10 of pointer to long" into "long *(*foo())[10]", and vice versa. Update to FF114. Includes source. by: Graham Ross with enhancements by David Wolverton, Tony Hansen, Merlyn LeRoy, Udi Finkelstein & more.

CLIcon Run CLI programs from workbench, similar in operation to IconExec, but more versatile. by: Bryan Ford

CloseMe Another ingenious perversion in the screen hack category. Don't miss this one...surely destined to become a classic! Includes source. by: Charlie Gibbs

DSM (Dynamic Sound Machine) Demo version with "Save" disabled of a program which will take any IFF sound or raw data and save it as a totally self-contained, runable program. by: Foster Hall

MRPrint A cli-based text file printing utility with lots of nice features, including tab-to-space expansion, page headers, line numbers, margin control with line-splitting and pagination correction, ARP wildcard support, and auto- rejection of files containing binary characters. Version 3.1, Includes source. Author: Mark Rinfret

Smus3.6a An enhanced version of the smus player that last appeared on FF58 Author: John Hodgson

Sounddemos Some very nice demos for showing off the incredible audio power of the Amiga!. 100% assembly language, Connect the stereo for these! Author: Foster Hall

Fred Fish Disk 168.*

Fred Fish Disk 169.*

* Fred Fish 168 and Fred Fish 169 contain and programs submitted by Matt Dillionmust be purchased at the same time to utilize the programs on the disk. In order to maintain the congruity of Matt Dillion's files, Fred kept the disks in their original form. We apologize for this inconvenience, but we feel the library should remain intact under Fred's original guide lines.

CONFIG V1.00 Configure friendly programs like DME for the initial window placement (configs the executable) by MDillion

Clock V1.00 Simple clock, configurable with config by MDillion.

DME V1.31 My programming oriented editor by MDillion

DMouse V1.10 Mouse enhancer .. acceleration, blanking, etc...(now handles requesters better w/ auto-activate) by M Dillion

Backup V2.01 HD backup/restore by M Dillion

SUPLIB Support (link time) library required to compile Matt Dillion's programs. by M Dillion

LIBREF Utility for generating run-time library link library assembly files, lvo.asm, & the run-time library's vector list. Currently very Aztec in what it generates. by MDillion

DRES V1 Support (run time) library w/ lots of functions including a generic parser and IPC. by Matt Dillion

DASM V2.11 Small-systems assembler. Handles 6502 and some of the Motorola single chip microcomputers. Generates code (not object module oriented). by Matt Dillion

FTOHEX Part of DASM used to convert a DASM executable into an intel-hex formatted ascii file. by Matt Dillion

FILES V1.2 Matt Dillion's disk catalog program. by MDillion

SHELL V2.10 Added enviroment variable support and more. Use ConMan if you want command line editing by MDillion

FINDIT V1.00 Search for a filename (wildcard) by MDillion

LIBS V1.00 list libraries/devices in ram or attempt to remove libraries. by MDillion

SCAT V1.00 Utility to 'cat' binaries without blowing up the display by MDillion

ADDCR V1.00 Utility to add CR's before LF's in files by MDillion

REMCR V1.00 Utility to remove CR's in files by MDillion

CMP V1.00 Utility to compare two files by MDillion

Fred Fish Disk 170.

Afterm Communications program utilizing IBM 3278 terminal emulation. Binary only. by: Don Brereton

Dis6502 A ported 6502 disassembler with support added for C64 binary files. Includes source. by: Robert Bond, Amiga port by Udi Finkelstein

FastText Blitter based fast text rendering routines written in assembly. Unique in the fact that they speed up rendering of non-proportional fonts of any height, and from 4-16 pixels in width. Source and test program included. by: Darren M. Greenwald

MRBackUp A hard disk backup utility that does a file by file copy to standard AmigaDOS floppy disks. Includes an intuition interface and file compression. Version 2.4, Update to FF129. Binary only by: Mark Rinfret

PtrAnim Nifty pointer animation program, includes lots of samples, a utility program and instructions on creating your own animations. Binary only, shareware by: Tim Kemp

Surf Generates bezier surfaces of revolution. Will produce some amazing pictures of wineglasses, doorknobs, or other objects one could turn on a lathe. Includes the capacity to map IFF image files onto any surface that it can draw. Source included by: Eric Davies

Turbo Opens a small window with a gadget that when selected, turns off bitplane, sprite, copper and audio DMA, to increase system speed. Source. by: Oliver Wagner

Fred Fish Disk 171.

AZComm Modified version of Comm 1.34 that contains Zmodem send, receive, and resume receive. Version 1.00, Binary only. by: SS. Patel, based on Comm 1.34 by DJ James

Maze A couple of very nice demos for the creation and use of single-solution mazes, one of which is practically a stand-alone game. Includes source. by: Werner Gunther

Sozobon-C Atari ST version of what appears to be a full K&R freeware C-compiler, assembler and linker. The compiler main pass and the assembler were compiled and tested on an Amiga A2000 with only minimal changes, and they appear to work (to the extent that they believe they are running on an Atari-ST), so an Amiga port should be relatively easy. by: Sozobon, Limited.

Xoper Very comprehensive program to monitor and control system activity. Monitor cpu, memory usage, ports, interrupts, devices. Close windows, screens, show loaded fonts or last Guru code number. Clean up memory, flush unused libraries, devices, fonts. etc. and a whole bunch more! Spawns its own process. A very handy background task to have loaded. Assembly source included. by: Werner Gunther

Fred Fish Disk 172.

DataToObj A utility to convert raw data files (sprites, image data, text, etc.) directly into object code which can then be linked to the main program without the need to go through the compiling process. Includes source. by: Werner Gunther

Handshake A full featured VT52/VT100/VT102/VT220 terminal emulator. he author has taken great pains to support the full VT102 spec. Now supports ANSI colors, screen capture and more. Update to version on FF60. Version 2.12a, binary only, shareware. by: Eric Haberfellner

MFix Small program to insert in the startup-sequence of the commercial program, Marauder II, from Discovery Software, International. When the copy process starts, the rainbow screen is covered by a bare screen until the copy is finished. Author claims a 25% decrease in copy time is achieved. V1.0, Binary. by: Stephen Gunn

PopInfo A "shrinkable" workbench utility to show you some info Workbench doesn't, such as free memory on external devices, chip, fast, and total ram usage and more. V2.0, Includes source. by: Jonathan Potter

ProCalc Simulates an HP-11C programmable calculator. Lots of enhancements and bug fixes since the original version on FF139. V1.2, binary only, shareware by: Gotz Muller

Spiff Make controlled approximations between two files. Similar to "diff" but more versatile. Allows for the handling of numerals as string literals or numeric values with adjustable tolerances. Provides for embedded commands, scriptfiles, and many other command-line parameters. Potentially very useful, needs some Amiga-specific work. Source and example files included by: Dan Nachbar, Bell Communications Research (BELLCORE)

Fred Fish Disk 173

CrcLists Complete C*. check files for disks 146-172 using the crc program from disk 133. These were made directly from FF masters Author: Fred Fish

FileSelect A FileIO selector, written 100% in assembly. V1.0, includes source Author: Fabrice Lienhardt

IffLib Ready-to-use library to perform various manipulations on IFF files. Includes a sample IFF viewer and a utility to save the front screen as an IFF file.Author: Christian A. Weber

ILBM2C Very useful utility for C-programmers. Reads in a standard IFF ILBM file and outputs a file that can be included in your program. Includes source and a sample program. Author: Tim Kemp

Tetrix An addictive game of speed, skill and luck. Based on a game originally called Tetris. The object is to fit together oddly grouped falling blocks to create a solid wall, which is then cleared from the bottom up. Sounds simple enough right? Sure...! Shareware, Version 1.1, Binary only. Author: David Corbin

Uedit Version 2.4g of this nice shareware editor. Has learn mode, a command language, menu customization, and other user configurability and customizability features. Binary only, shareware, update to FF121. Author: Rick Stiles

Fred Fish Disk 174

Castle A simple graphics adventure game suitable for beginners. Binary only. Source available with a small donation to the author. Author: H. James Fox

Iff2Sun A small utility for those of you who may have access to a Sun workstation. Takes an Amiga IFF file and converts it to a Sun rasterfile format. Source only, as the program needs to be re-compiled and run from a Sun. Authors: Steve Berry, Mark Thompson

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Print1.2 CLI-based printing utility with several nice features including the ability to print in ASCII or HEX, with or without line numbers and a CTRL-C Trap. Includes source. Author: John F. Zacharias

Sh Another version of the 'Sh' utility to unshar shell archives. Apparently corrects some problems encountered by similar programs. Until we can get everybody using some sort of "standard", perhaps if we collect enough of these utilities, we will eventually find one that works with the particular archive we're trying to unshar! Includes source. Author: Jim Guilford

Srings A simple utility with command-line options for locating strings in a binary file. V1.0, includes source. Author: Joel Swank

TitlePage Prints banner-type title pages for identifying listings. Lots of command-line options for specifying various fonts, pitches, typestyles, selectable centering, etc. Includes source. Author: Joel Swank

Tunnel An interesting graphics demo written in TDI-Modula 2. I suggest you don't stare at this too long! Includes source. Author: Garth Thornton

Fred Fish Disk 175

Elements Very nice interactive display of the the Periodic Table of Elements. Can display a large amount of pertinent data about a selected element along with a good deal of general and miscellaneous info. Author: Paul Thomas Miller

Furnish For those of you who may have ever used the "scale size cut and place" method of determining your next living-room arrangement, this Amiga-ized version may be just what you need. Binary only, shareware. Author: Terry Gintz

Plot Program to compute and plot 3 dimensional functions. Major revision to PD version on FF49 by the same author. V4.1, binary only, shareware. Author: Terry Gintz

SafeBoot Very handy intuition-based program to read and save custom bootblocks. The bootblock can then be later restored should the disk become virus-infected. V2.2, binary only. Author: Mark Lancux

SendMorse Brush up on your morse code with this simple program that will read an input textfile and output the characters at an adjustable rate. Author: Joe Larson

VirusX V 3.10 of the popular virus detection/vaccination program. Features a test for the new IRQ virus, among others, and a new "Kill Virus" utility. Includes source. Author: Steve Tibbett

WBDepth CLI program that allows you to change the number of bitplanes for the WB screen on the fly. Very useful for A500 and A2000 users with kickstart in ROM. Binary only. Author: Andry Rachmat

Zippy A "Graphical Shell". Opens a medium-size window and attaches a menu-strip for performing all sort of disk/data manipulations. Features script files allowing you to attach custom menu selections as you move between directories. Also included is an intuition based utility for altering FileInfo data. (filename, filenote, RWED attributes, etc.) V 2.5, binary only. Author: Michael Weiblen

Fred Fish Disk 176

AnalytiCalc V23-2A of Glenn Everhart's large and powerful spreadsheet program called AnalytiCalc, submitted to me directly by Glenn for inclusion in the library an update to FF144. AnalytiCalc is presented in entirely ZOOed form because it could not otherwise fit on a single disk. With this release, AnalytiCalc has become "Freeware" rather than "Shareware". Thus the only restrictions on AnalytiCalc code are that derivative programs remain freely distributable.

HyperNet HyperNet is a small hypertext shell program for Amiga, presented with sources and brief documents. . HyperNet allows a "master" AmigaDos process to control a series of connected processes, where the connections are randomly ordered directed graphs. Permissible "child" processes available at any stage are governed by the links of the graph. The implementation is mainly instructive, but can be used for tutorials or demonstrations and illustrates the simplicity of hypertext concepts on a multi-tasking system. Author Glenn Everhart

Fred Fish Disk 177

ASpice A version of the SPICE 2G.6 circuit analysis program which has been modified to run in the Amiga environment. The program arrays are adjusted to require one forth the memory of the DEC VAX version. Although this does not usually put much of a constraint on circuit analysis, some users who are used to the full mainframe environment may have to be more aware of the memory demands of their analysis. Requires a minimum of 1.5 MB memory. This version neither supports nor requires the 68020 processor or 68881 coprocessor. Binary only. Authors: Many, see Documentation

DiskSalv V1.32 of the popular "undelete" and file recovery program. Fixes a few bugs apparently found on the V1.3 on FF164. Author: Dave Haynie

Jask An intuition-based replacement for the ASK command. Will bring up a requester with a message and boolean yes/no type gadgets. V 1.0, includes source. Author: John Barshinger

Marge A simple CLI utility to add a specified number of spaces or tabs to the left side of every line in a file. Includes source. Author: Joel Swank

Path An interesting concept in path-searching. This program contains a path-handler that allows you to selectively control or assign your system's search path using script files. Includes source. Author: Rico Mariani

Fred Fish Disk 178

AmicForm Creates a phonebook containing only those areacodes and exchanges reachable through PC-Pursuit. Update to FF157. Works with the new Finalist BBS format. V1.4, Binary only. Author: John Motsinger

BlackBox The black box is an 8x8 grid in which several "atoms" are hidden. Your job is to find the atoms. You have at your disposal a ray projector which you can use to send rays into the box from any of the 32 spots around the box. Binary only. Author: Tim Kemp

CIATimer Two versions of ciatimer routines to provide precise timing for applications requiring a high-accuracy real-time clock. Includes source and a sample executable. Author: Karl Lehenbauer, based on the original version by Paul Higginbottom

Cosmic An interstellar multiplayer game of War and Peace. From the looks of the documentation file, it appears fairly extensive! V1.01, includes source. Author: Carl Edman

Ls V2.0 of the popular UNIX style directory lister. Revised for Lattice 5.0 and made 1.3 compatible. Includes source. Author: Justin V. McCormick.

RemLib Removes a specified library (if currently unused) or displays some information about all available libraries. Update to FF139. V1.11, includes source in assembler. Author: Heiko Rath

RexxArpLib V2.0 of the rexxarplib.library, which has grown considerably, with substantial intuition interface support. Also included is a large number of ARexx macros. Author: W.G.J. Langeveld

To Be Continued.....

In Conclusion

To the best of our knowledge, the materials in this library are freely distributable. This means they were either publicly posted and placed in the public domain by their authors, or they have restrictions published in their files to which we have adhered. If you become aware of any violation of the authors' wishes, please contact us by mail.

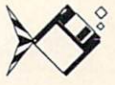
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- O 7. Modem
- O 8. Music Tool
- O 9. Video Product
- O 10. Other

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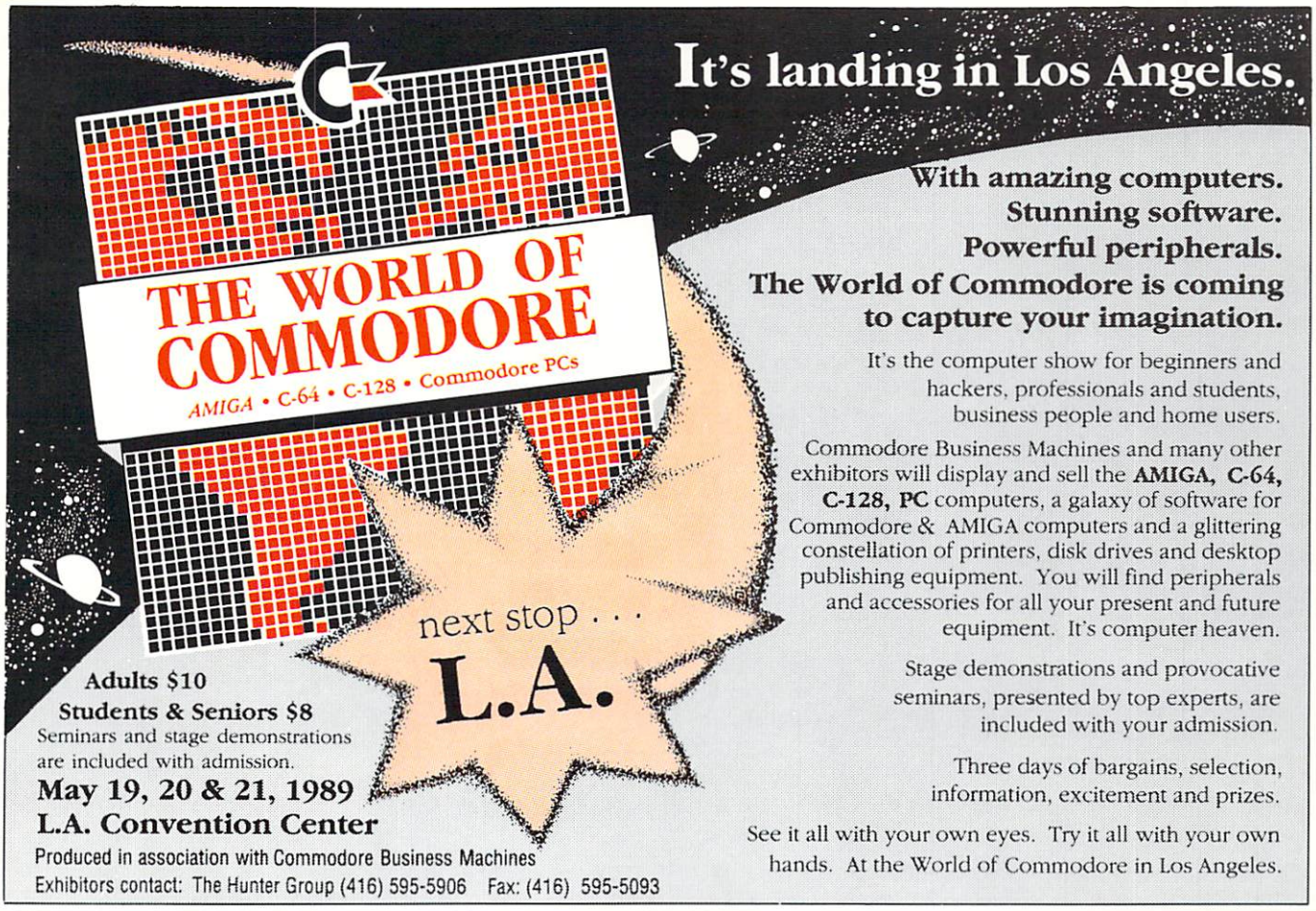
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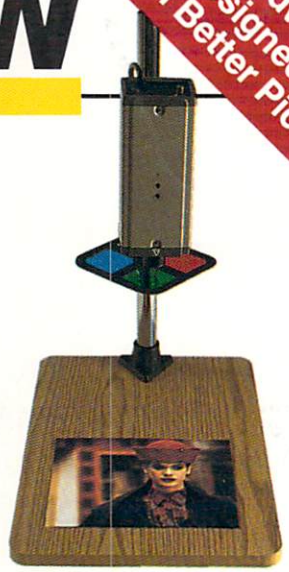
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